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Ketchak - Dance of Bone

Originally the ketchak was a choir of men who by their litanies cooperated with the Sanghyang girl that was to be put into a trance. The intention of any Sanghyang (trance) performance was that the girl while in a state of trance (semi-consciousness) would be capable of hearing and telling the wishes of the gods or of the ancestors.

At present this ketchak is also performed with a special story (libretto). This story has been chosen from the Ramayana saga. Very condensed, the contents of the Ramayana saga are as follows :

By intrigue Rama, the legal heir to the throne of Ayodhya, is exiled from the realm of his father Dasaratha. Accompanied by his wife Sita and his younger brother Laksamana he moves from his father's palace and goes into the forest. Here he goes through many adventures and finally he is chasing the deer with the golden horns. At a certain moment his wife Sita remains alone without protection. Then she is kidnaped by the followers of Rawana, the king of the demons. After that, Rama with the assistance of the army of monkeys, under the command of Hanuman, attacks the residence of Rawana, called Lengkapura (Ceylon).

The monkeys are building a weir of bridge between Hindustan and Lengkapura and the battle ends with the victory of Rama. Some episodes from this saga are represented in the dance of the principal figures :

1. After the departure of Rama, Sita is speaking to his younger brother Laksamana. Sita orders him to go and help Rama who has persued the deer with the golden horns, because Sita hears a call for help, thinking it is Rama, who calls for help.
2. Sita, already kidnaped by Rawana, is staying at a bower in his palace. There she is visited by Rawana, who asks her hand for marriage. She then burst all into tears.
3. Rama marches out to Lengkapura to rescue Sita, his wife. He meets Meganada, Rawana's son and becomes involved in a combat with the demon. Meganada shoots his arrow, which turns into a serpent and ties Rama up like a rope.
4. Rama tied up, beseeches the gods to help him. Then Wishnu's bird, Garuda, is sent to free Rama.
5. Hanuman, the king of the monkey talks with his generals and mobilizes his army for a battle against Lengkapura. The performance ends with the battle-scene between the army of Hanuman (monkeys) and the army of Rawana (Rakshashas or demons).

N.V. Travel Bureau „BALITOUR”
Denpasar (Bali)

Collection and Field Note Book

No. 53

(Nov. 5, 1958 - Jan. 20, 1959)

(39651 - 39809)

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EXCURSION III

to

Baluran (East Java) and Bali

by Bus.

- Dec. 22. Leaving Tjiawi at 6.00 a.m. for Solo in Central Java via Bandung, Tjirebon, Tegal, Semarang and Salatiga. It will be a heavy journey this day. Midway Tjiawi-Bandung we will see some plantations of teak, which are truly out of bounds from an ecological angle: the annual rainfall is too high; age about 10 years. Afterwards the bus climbs along the slopes of bare hills: G. Missigit tertiary formations of limestone. Bandung will be reached at 8.30; the capital of West Java, well-known since the Asia-Africa Conference in 1956; Centre of Institutes devoted to the study of the Natural Sciences, Physics, etc. Leaving Bandung on our left hand the volcano Tangkuban-prahu, which is still active, on the slopes of which are cultivated Cinchona and Pinus merkusii. For some kilometres we will drive along ravines with picturesque landscapes, with Bamboo, Eupatorium palescens and Alsophila spp. Entering the plains of Tjirebon on our right hand we see the Nunuk hills, which are severely eroded. These plains are the most western part of Java where sugar cane can be grown. From here the region with a distinct monsoon climate starts. From Tjirebon to Semarang the road follows the north coast of Central Java. This is a region where onions are grown on a large scale and further more sugar cane and rice. Lunch will be at Tegal at 13.00. At 5.00 p.m. we will be passing through Semarang the Capital of Central Java. Along the road to Salatiga we see Myristica fragrans (nutmeg) and Hevea plantations. At sunset we will have left Salatiga and we hope to arrive at the Dana-Hotel in Solo at 7.00 p.m. Solo is the Centre of Javanese art and culture. The Sunan has his palace here.
- Dec. 23. Solo - Madiun - Gempol - Pasirputih. Departure from the Dana-Hotel at 7.00 a.m. For an hour the journey is not very interesting: wide plains just ploughed for growing rice in the next wet season.

After crossing the border between Central and East Java (after about one hour and a half) we will be driving through teak plantations, most of which are devastated by cattle.

Typical species of the Malaysian Monsoon Forests will be seen here, some of which are: *Acacia leucophloea*, *Schleichera oleosa*, *Schoutenia ovata*, *Butea monosperma*, *Lagerstroemia cinerea*, *Homalium tomentosum*.

Before Ngawi near Trinil, Dubois discovered the famous *Pitecanthropus erectus* dating from the middle-pleistocene.

The volcano on our right hand is the Lawu.

After Madiun we will see again some teak forests of various age.

Just after Kertosono the river Brantas will be crossed; this river causes trouble every year by its floods.

Between Djombang and Modjokerto was the centre of the 13th century kingdom of Modjopahit. In a museum in Trowulan, near Modjokerto, some antiquities from those times are conserved.

At 1.00 p.m. lunch will be served at Gempol.

The afternoon-trip after Gempol along the north coast of East Java will be for about 3 hours via Pasuruan, Probolinggo. End of this day's journey will be Pasir-putih (White sands); staying the night over here in rest-houses on the beach.

The Baluran region

This region centering around the extinct Baluran volcano is characterized by its dry climate (less than 1000 mm annually) with a severe dry monsoon of 10 months. In the dry season dry winds come down from the Idjen Pass (600 ft.).

There are practically no rivers. The soil, originally lava, has changed into heavy, black earth, strewn with basalt and andezite blocks.

The vegetation is savana-like, along the small mountain streams we find gallery forest. During the dry season the vegetation burns regularly, which prevents the re-establishment of the forest. The latter is well developed towards the summit of the Baluran.

Many plants have subterranean parts enabling them to survive drought and fire, such as *Dioscorea hispida*, *Asparagus racemosus*, *Crinum asiaticum* and some orchids (*Plantanthera susannae*, *Pogonia nervillia*).

The trees are deciduous and flower often on the bare branches, e.g. *Dillenia pentagyna*.

Of the grasses the most common is *Andropogon amboinicus*, f. *genuinus*, which becomes more than 2 m tall. Other species are *A. parviflora*, *A. zollingeri*, *A. triticus*, *A. contortus* and *A. subtilis*. Other tall grasses are *Rottboelia exaltata* and *Ophiurus exaltata*, which remind one of a horses tail.

Themeda argueus is also common.

Among the trees the most conspicuous are *Acacia leucophloea* with yellow-white bark.

The *Palmae* are represented by *Borassus flabellifer* and *Corypha gebanga*.

Scattered here and there we find *Ficus superba* (krasak), and in the driest places a thorny scrub consisting of *Feronia elephantum*, *Aegle marmelos*, *Acacia tomentosa* *Homalium tomentosum*.

We also encounter *Schleichera trijuga* (Kosambi), *Protium javanicum*, *Grewia*, *Phyllanthus emblica*, *Melia Azedarach*, *Albizia lebbeckoides* and *A. procera*, *Cordia obliqua*, *Morinda tinctoria* and *Schoutenia ovata*, *Tamarindus indica*.

On level ground where the heavy impermeable black soil is deeply cracked during the dry season, the grass cover is thinner and *Zizyphus mauritiana* is common, often with an abundance of *Ipomoea heterophylla*.

At the margins of the open places occur the yellow-flowering *Abutilon indicus* and *Thespesia lampas*, in moister places *Ophioglossum reticulatum*.

Rauvolfia serpentina grows in the better parts of the forest, *Butea monosperma*, the flame of the forest, is common in teak plantations. The teak does not do very well here.

Jan. 200
Feb. 200
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A BOORMAN & PLATT PRODUCT

Nov. 5 - Trip by Pennsylvania
R.R. from Washington to New
York - left side of river.

Fall coloring about at its
height or a little past.

Leaves almost all fallen
from *Liriodendron*, *Robinia*,
Betula nigra, and some *Platanus*.
Fagus bare, branchlets green color.

Liquidambar about at
its best, with a range
from yellow through orange
to reds and purples. *Acer*
rubrum very striking, from
bright yellow to bright red.

Nyssa scarlet but some
trees bare. *Quercus alba*
dull purple but mostly
already gray-brown. *Quercus*
velutina mostly already brown.
Quercus coccinea deep red
to maroon. *Quercus palustris*
orange-brown to reddish.

Quercus phellos greenish brown.
Quercus ^{in places} ~~nearby~~ bare. *Quercus* ~~white~~
orange-red-brown. There

seems to be considerable
variation in stage of change
according to habitat variation.

Extensive pine land along
the south of Odenton.

North of here the season
becomes rapidly more advanced
mostly oaks and willows still
with leaves.

What appears to be a magnolia bog across from the big Westinghouse plant, south of big dual highway, several miles south of Calvert Distillery, south of Baltimore.

North of Baltimore there seems little difference from the situation described for north of Washington. The season seems much less advanced than it is immediately south of Baltimore. Perhaps the differences may be more physiographic than climatic.

Small magnolia swamps along left side just south of first large arm of bay crossed by track. In this arm are large areas of marsh now completely straw colored, west of track some distance.

Same variation in apparent stage of advancement of season noted north of Aberdeen. It seems really only a matter of the forest type concerned, those where

the dominant trees are mostly bare seem more advanced.

North of Philadelphia the trees are not entirely bare, but more so than southward, and the colors are much less evident.

In New Jersey there is little color left, except in the shrub layers. Some trees are still green, however. This probably generally reflects the extremely wet season this past summer, and the lack of hard frosts. The oak leaves are mostly brown. *Petula populifolia* and *Populus tremuloides* (or *P. grandidentata*) are yellow. *Liquidambar*, though not abundant, is very well colored.

The conspicuous coloration in the shrub layers in the woods where the trees are already bare should be emphasized. Most of the shrubs could not be identified from a distance, but some are *Acer rubrum*.

Nov. 12 - air trip, Washington to San Francisco, direct, 30 min. right side of plane.

Along Potomac above Washington to somewhat below Great Falls and then over Montgomery Co. Md. Some autumn coloring still apparent, but most trees bare or brown. Rapidly less color westward. Very little left at Sugarloaf Mt. and westward.

Considerable amount of pine forest in Montgomery Co. just west of Washington, mostly sharply outlined patches, in general not differing much from the outlines of presently cultivated fields.

Some color still in Catoctin and Bull Run Mts. at Point of Rocks. Scarcely any in lowlands west of here, but again scattered yellow trees ~~west~~ and some red on east slope of Blue Ridge at Harpers Ferry. West slopes red-brown. Two main ranges of Blue Ridge here in Maryland side, completely separated, the western one only going a short way north, several subordinate ridges

just to the west of it, also going only a short way north. Potomac meanders ^{from} northward ~~after~~ before reaching the Harper's Ferry gap.

Then course turned somewhat more southward, over a small city (with airport) and a large quarrying operation that may be a cement plant.

Then a series of straight even wooded ridges separated by flattish cultivated valleys, some foothill land, also wooded, dissected by transverse ravines but north-south parallel ridges very noticeable even in spite of this.

Forest on ^{main} ridges mostly deciduous, with a scattering of conifers, but the rolling or flattish land of the foothills and valleys, where wooded, has a substantial proportion of pure coniferous forest, this mostly in angular patches which are certainly old fields.

West of about the 3rd or 4th main ridge is a valley with striking entrenched meanders. West of this a ridge with flattish tops, cultivated, but parts with angular pine flat tops on top, but heavily wooded.

Thinned out into
Rayton, I, and 1. dramatis
over almost solidly constituted

Mls.	Read Down	Altitude	Mls.	Read Down
0	0 LV SAN FRANCISCO Cal. 11.15AM	4225	1424	Ar CLOVIS (MST) N.M. 2.45PM
	Passengers take motor coach direct to train side in Richmond			At Clovis turn west on AHEAD one hour.
	Cross San Francisco Bay. 11.20AM			Highland, Clovis, and Los Angeles Dallas Tunnels and Chain Tunnels and to Fresno at Clovis.
36	7 LV OAKLAND Cal. 11.25AM			Train 25 Lv. Clovis 2.45 am. Ar. Clovis 1.00 am. to connect with Train 2.
40	10 LV BERKELEY Cal. 11.35AM			
43	18 Ar RICHMOND Cal. 11.54AM			
43	18 LV RICHMOND Cal. 11.59AM			
70	26 LV PINOLE Cal. 12.14PM	4225	1428	Ar CLOVIS (MST) N.M. 2.45PM
21	52 LV PITTSBURG Cal. 12.47PM	4138	1437	Ar ARWELL-TEXICO Tex. 4.31PM
	Cross Old River. 1.08PM	4005	1453	Ar FRONA Tex. 4.52PM
	Cross San Joaquin River. 1.19PM	3798	1486	Ar HEREFORD Tex. 5.12PM
23	86 LV STOCKTON Cal. 1.24PM	3620	1514	Ar CANYON Tex. 5.38PM
	Cross Stanislaus River. 1.48PM	3667	1532	Ar AMARILLO Tex. 6.00PM
112	112 LV RIVERBANK Cal. 4.49PM			Train 24, Lv. Lubbock 3.05 pm. Ar. Amarillo 5.25 pm. where Chicago Pullman joins Train 2.
118	118 LV EMPIRE Cal. 1.55PM			
	Cross Tuolumne River. 1.58PM	3652	1532	Ar AMARILLO Tex. 6.10PM
	Cross Merced River. 2.10PM	3443	1559	Ar PANHANDLE Tex. 6.35PM
172	151 LV MERCED Cal. 2.30PM	3225	1586	Ar PAMPA Tex. 6.59PM
	Cross Chocoma River. 2.48PM	2736	1608	Ar MIAMI Tex. 7.21PM
	Cross Fresno River. 2.49PM	2348	1630	Ar CANADIAN Tex. 7.45PM
	Cross San Joaquin River. 2.50PM	2569	1656	Ar HIGGINS Tex. 8.12PM
206	209 LV FRESNO Cal. 3.30PM	2237	1670	Ar SHATTUCK Okla. 8.30PM
	Cross Kings River. 3.40PM	2128	1678	Ar GAGE Okla. 8.41PM
248	240 LV HANFORD Cal. 4.05PM	1903	1702	Ar WOODWARD Okla. 9.12PM
315	295 LV WASCO Cal. 4.48PM	1464	1737	Ar WAYNOKA Okla. 10.05PM
350	302 LV SHAFTER Cal. 4.56PM	1327	1758	Ar ALVA Okla. 10.27PM
404	320 Ar BAKERSFIELD Cal. 5.25PM	1326	1766	Ar KIOWA Kan. 10.50PM
404	320 LV BAKERSFIELD Cal. 5.30PM	1443	1787	Ar ATLANTA Kan. 11.14PM
755	389 LV MOJAVE Cal. 7.50PM	1417	1799	Ar HARPER Kan. 11.53PM
	408 LV EDWARDS Cal. 8.11PM	1205	1814	Ar WELLINGTON Kan. 12.20AM
105	457 Cross Mojave River 8.08PM	1312	1878	Ar WICHITA Kan. 1.10AM
105	458 Ar BARSTOW Cal. 9.10PM	1445	1905	Ar NEWTON Kan. 2.05AM
476	458 Ar BARSTOW Cal. 9.20PM	1138	1978	Ar EMPORIA Kan. 3.10AM
	623 LV NEEDLES (PST) Cal. 12.05AM	889	2039	Ar TOPEKA Kan. 4.25AM
	Leaving Needles turn west on AHEAD Donohue.	811	2066	Ar LAWRENCE Kan. 4.50AM
	635 Cross Colorado River, Calif. 1.17AM		2104	Cross Kan.-Mo. boundary. 5.38AM
4335	684 Ar KINGMAN (MST) Ariz. 12.14AM	781	2105	Ar KANSAS CITY Mo. 6.00AM
5242	772 Ar SELIGMAN Ariz. 3.52AM	781	2105	Ar KANSAS CITY Mo. 6.30AM
5128	797 Ar ASH FORK Ariz. 4.25AM	2131		Cross Missouri River. 7.05AM
6748	824 Ar WILLIAMS Ariz. 5.15AM	664	2170	Ar CARROLLTON Mo. 7.39AM
	For Grand Canyon Lv. Williams 7.40 am. via motor coach. Ar. Grand Canyon 9.25 am.	2186		Cross Grand River. 7.50AM
	861 Cross Arizona Divide 5.43AM	857	2209	Ar MARCELINE Mo. 8.10AM
902	958 Ar FLAGSTAFF Ariz. 5.53AM	2233		Cross Chariton River. 8.50AM
	889 Cross Canyon Diablo 6.23AM	914	2244	Ar LA PLATA Mo. 9.40AM
4843	916 LV WINSLOW Ariz. 6.50AM	2277		Cross N. Pecos River. 9.11AM
	919 Cross Little Colorado River 6.53AM	2280		Cross Wynconda River. 9.18AM
5080	948 LV HOLBROOK Ariz. 7.19AM	2305		Cross Dos Molas River. 9.20AM
	1022 Cross Ariz.-N.M. boundary 8.14AM	521	2321	Ar SHOPTON Mo. 9.55AM
6506	1043 LV GALLUP N. Mex. 8.38AM	523	2322	Ar FT. MADISON Mo. 10.00AM
	Cross Continental Divide. 9.07AM	3233		Cross Mississippi River. 10.30AM
	Cross Rio Puerco. 10.27AM			Cross Illinois boundary. 10.30AM
4785	1188 Ar HELEN N. Mex. 10.50AM			

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Thank you—happy traveling

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Thank you—happy traveling

Nov. 16 - Railroad trip Santa Fe (A.T. & P.F.) route from Richmond along the upper San Francisco Bay to the San Joaquin Valley.

grassy hills along south side of bay completely dry and dull gray brown, except for occasional scattered broad-leaved plants. Patches of planted eucalyptus. *Grindelia* in flower along track. *Foeniculum vulgare*. A few small marshes in ravines emptying into bay. some with *Salicornia*, mostly with *Typha* some along the shore on flat low ground. In hills in places scattered dark green *Baccharis pilularis*. Ravines have *Salix*, *Quercus*, etc.

Beyond Pinole are higher hills to left of route, with patches of coastal sage, open oak forest, and ravines with oak forest. otherwise dry grass and patches of ~~late~~ autumnal herbs. More woody vegetation scattered.

Most of the oaks are evergreen, doubtless both *Q. agrifolia* and *Q. chrysolepis* represented, as aspect is varied. Some *Juglans californica*.

North slopes beyond tunnel at Glenn are covered by open oak forest, south slopes with grass and oak savanna.

Some orchards and vineyards on hills but not in good shape.

Out of the hills, directly north of Mt. Diablo, are extensive marshes of quite varied aspect. These lie on flats between rounded grassy hills and Suisun Bay. Some flat land not low enough to be marshy.

Many large refineries and chemical works and other factories. These around Pittsburg.

Beyond Antioch mostly vineyards and orchards. Rows of Eucalyptus. Ground somewhat rolling, sandy. Some marsh locally. A few oaks very locally.

Old River

Near ~~San Joaquin River~~ vast areas of low intensively cultivated land in truck crops, crossed by large canals and channels of the river, lined by oaks of *Quercus*, some *typha*, ^{some Phragmites}, patches of *Salix*, great masses of floating *Juncus californicus* and *Rickhornea crassipes*.

One of the crops is asparagus. Eastward in this area is considerable blowing dust, west of Holt.

South of Stockton - flat cultivated land with scattered large *Quercus lobata*, bare or partially so at this season.

Much snow visible in high Sierras to the east.

Between Hughson and Denair, to east of track, what appears to be a vernal pool. (about 1 1/2 or 2 min. before Denair).

Dominant agricultural types from Merced to beyond Planada orchards and some vineyards. Around Planada large acreage of figs, mostly trimmed down

to a dwarfed spreading stature. South of Placerville the route goes for a short distance through rolling grassland, then more orchards, large areas of irrigated land. After Le Grand large areas of slightly rolling grassland and dry farming. Soil is light brown, varying to chestnut and light and dark gray.

Wooded banks along dry sandy channels of Chowchilla River.

Last areas of rolling essentially treeless dry farmed land between Chowchilla and Fresno Rivers. more luxuriant around Madera.

South of Fresno the country is intensively cultivated, largely in cotton.

Near Kings River and just south of it is rather close savanna or open forest of large oaks, either *Q. lobata* or *Q. douglasii*.

About 5 miles south of Hanford is an area of short grass, probably *Dactylis*

with winding shallow channels with shallow water and scattered salses. Farther on other similar areas with dry short herbaceous vegetation rather than *Dactylis*. These areas may be alkaline. Generally the country is farmed. Soils are generally of a light gray color. *Salsola* seems to be the principal weed.

What appears to be the old Tulare Lake bed (72 mi. ^{W. of} ~~from~~ Waxes), is an extremely sparsely populated area, extending for miles without a house. Much of it is cultivated but some seems to be in a sparse very short grass, with scattered *Salsola*.

Home shown in Tehachapi Pass.

Nov. 17 - west of Williams

~~open~~ piñon-juniper open scrub forest with thin grass, some areas with *P. ponderosa* forest. A few inches of snow. Between Williams and Flagstaff - open but more or less continuous stands of small pines 3-5 m. tall, with thin grass and with scattered taller pines, 20-25 m. tall. So much snow that it is hard to be sure if the small pines are *P. ponderosa*, but they probably are. The large ones are. This situation could arise from fire or from planned logging and management, or perhaps from former heavy grazing.

East of Flagstaff the pine forest is more varied, some open ground. Some areas of scattered pine with abundant seedlings - in a few years it will look much like that described above. Some uniform open pine forest areas 4-6 m. tall, no tall pines. Then piñon-juniper open scrub forest over large areas. A few inches of snow everywhere.

EL CAPITAN

Tr. 18, Eastbound, 39½ hrs. Los Angeles-Chicago
Daily, All-Chair-Car Hi-Level Streamliner.
Extra fare train.

Altitude	Mls.	Read Down	Altitude	Mls.	Read Down
13		Leave San Diego Train 79, 5.00 pm, arrive Los Angeles Union Station 7.35 pm.	4045	1235	Ar LA JUNTA..... Colo. 8.20PM
318	0	Lv LOS ANGELES..... Cal. 8.00PM	4045	1235	Lv LA JUNTA..... Colo. 8.25PM
35	2	Cross Los Angeles River. 8.05PM	1256		Cross Purgatoire River... 8.44PM
		Long Bench passengers for El Capitan leave at 7.00 p.m., via motor coach for Pasadena.	1269		Caddoa Dam..... 8.51PM
830	9	Lv PASADENA..... Cal. 8.30PM	3603	1288	Lv LAMAR..... Colo. 9.05PM
	21	Cross San Gabriel River. 8.52PM			Stops at Lamar to receive passengers for Kansas City and beyond or South of Newton and to discharge passengers from Albuquerque and beyond.
860	31	Lv POMONA..... Cal. 9.07PM	1310		Cross Arkansas River... 9.23PM
1077	60	Lv SAN BERNARDINO..... Cal. 9.37PM	1320		Cross Colo.-Kan. boundary 9.28PM
3822	87	Cajon Pass between San Bernardino and San Gabriel Mountains..... 10.11PM	2830	1387	Lv GARDEN CITY..... Kan. 10.24PM
	108	Cross Mojave River... 10.55PM			Stops at Garden City to receive passengers for Kansas City and beyond or South of Newton and to discharge passengers from Albuquerque and beyond.
2105	142	Lv BARSTOW..... Cal. 11.35PM			Ar DODGE CITY (MST) Kan. 11.15PM
476	308	Ar NEEDLES..... Cal. 2.07AM			At Dodge City turn watches AHEAD one hour.
476	308	Lv NEEDLES (PST)..... Cal. 2.17AM	2486	1437	Lv DODGE CITY (CST) Kan. 12.18AM
		Leaving Needles turn watches AHEAD one hour.			Cross Arkansas River... 12.50AM
326		Cross Colorado River, Calif.-Arizona boundary 5.25AM	2486	1437	Cross Arkansas River... 1.00AM
5242	457	Lv SELIGMAN (MST) Ariz. 6.11AM	1530	1558	Lv HUTCHINSON..... Kan. 1.53AM
6748	509	Lv WILLIAMS..... Ariz. 7.26AM			Stops at Hutchinson to receive passengers for Kansas and beyond or South of Newton and to discharge passengers from Albuquerque and beyond.
7313	536	Cross Arizona Divide... 7.50AM	1445	1591	Ar NEWTON..... Kan. 2.30AM
6902	567	Lv FLAGSTAFF..... Ariz. 8.06AM	1445	1591	Lv NEWTON..... Kan. 2.35AM
	574	Cross Canyon Diablo... 8.57AM	1775		Cross Kan.-Mo. boundary 3.01AM
4843	601	Lv WINSLOW..... Ariz. 9.05AM	781	1776	Ar KANSAS CITY..... Mo. 5.35AM
	604	Cross Little Colorado River 9.08AM	781	1776	Lv KANSAS CITY..... Mo. 5.50AM
	707	Cross Ariz.-N.M. boundary 10.08AM	1802		Cross Missouri River... 6.02AM
6506	729	Lv GALLUP..... N.Mex. 10.52AM	1857		Cross Grand River... 7.18AM
7247	758	Cross Continental Divide 11.20AM	1903		Cross Chariton River... 7.58AM
	854	Cross Rio Puerco... 12.50PM	1947		Cross N. Pablos River... 8.18AM
	878	Cross Rio Grande... 1.03PM	1958		Cross Wyaconda River... 8.27AM
4934	889	Ar ALBUQUERQUE..... N.M. 1.15PM	1976		Cross Des Moines River 8.30AM
4934	889	Lv ALBUQUERQUE..... N.M. 1.25PM			Missouri-Iowa boundary 8.50AM
5457	956	Ar LAMY..... N.Mex. 2.30PM	521	1992	Lv SHOPTON..... Ia. 9.20AM
986	974	For Santa Fe and Land of Pueblos take motor coach from Lamy 2.35 pm, arrive Santa Fe 3.10 pm.	523	1994	Lv FT. MADISON..... Ia. 9.25AM
		Leave Santa Fe 1.45 pm, via motor coach to connect with the El Capitan at Lamy.	1995		Cross Mississippi River... 9.27AM
6457	956	Lv LAMY..... N.Mex. 2.30PM	755	2049	Lv GALESBURG..... Ill. 10.15AM
	991	Cross Pecos River... 3.00PM			Stops at Galesburg only to discharge passengers from Lamy, N. M. and scheduled stops Albuquerque and beyond.
1020		Cross Gallinas River... 4.03PM	2063		Cross Spoon River... 10.30AM
6392	1021	Ar LAS VEGAS..... N.Mex. 4.05PM	515	2096	Ar CHILLICOTHE..... Ill. 11.00AM
6392	1021	Lv LAS VEGAS..... N.Mex. 4.08PM	2098		Cross Illinois River... 11.02AM
		Passing through Rocky Mountains—beautiful views of mountains.	2135		Cross Vermilion River... 11.35AM
6666	1131	Ar RATON..... N.Mex. 6.01PM	625	2137	Lv STREATOR..... Ill. 11.40AM
6666	1131	Lv RATON..... N.Mex. 6.04PM	2174		Cross Kankakee River... 12.15PM
7588	1138	Cross New Mexico-Colo-rado boundary through Raton Tunnel, one-half mile long and highest point on the Santa Fe. 6.25PM	549	2188	Lv JOLIET..... Ill. 12.30PM
		5971 1153 Lv TRINIDAD..... Colo. 7.01PM	2202		Cross Des Plaines River... 12.40PM
		Stops at Trinidad only to receive passengers for Kansas City and beyond or South of Newton and discharge passengers from Albuquerque and beyond.	2215		Cross Des Plaines River... 1.10PM
		Stops to discharge passengers from scheduled stops Albuquerque, N. M. and beyond.	593	2226	Ar CHICAGO (CST)..... Ill. 1.30PM
		Stops to discharge passengers from scheduled stops Los Angeles to Barstow; also to receive passengers for scheduled stops Albuquerque and beyond.			
		Stops to discharge passengers from Los Angeles; also to receive passengers for scheduled stops Kansas City and beyond.			
		Indicates Rail-Auto Service available.			

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HERE'S HOW TO OPERATE YOUR CHAIR

A This trigger on arm controls back of seat. Pull up on trigger and push seat back to position desired. When seat is reclined pull up on trigger to bring back of seat forward.

B Legrest pulls up and can be set to position desired. Notice that when you pull legrest to a position higher than level of seat it will drop down.
By turning legrest completely upside down you can make a crib of seat for small child.

C Button at inside top of each seat permits you to adjust top part of seat to position you find most comfortable.

There is a center arm that folds into back of seat when not in use.

Reading lamp focused above each seat can be used as you desire.

We caution passengers not to stand or sit on leg rest of their seats as they will not support your weight and may cause injury.

PILLOWS are available from the news agent. He will be through the train to offer you a pillow, which can be purchased for 50c for your trip.

DRESSING ROOMS AND LAVATORIES are located on the lower level of each chair car. Also, there are lavatories on the upper level of the lounge car.

Out on open flat plateau between Flagstaff and Winslow the piñon-juniper gets smaller, pitering but shortly after half way to Winslow. Just before this, while the bushes are still 2 m. tall, is a vast area south of the track in which every single bush has been uprooted and is lying where it fell.

East of the end of the piñon-juniper is a dwarf scrub-savanna steppe with bushes up to 1 m. tall, mostly less than 0.5, possibly bushes, some eltiples (?). This grades into steppe with practically no bushes locally but mostly a very widely scattered dwarf scrub savanna.

Thin snow generally.

East of this two areas of curious erosion remnants of wind rounded sandstone seemingly lying at random on the slightly rolling steppe covered plateau.

Still east of this the steppe changes to a ~~rough~~ grass steppe with locally tufts of *Chrysopsis* and another type of erosion, remnant low mesa-like, sparsely and unevenly distributed on the plateau. They are more dwarf scrub savanna.

Just east of Winslow are considerable areas of *Tamara* scrub, mostly along a broad wash which now has water in it. The *Tamara* has turned a burnt orange-brown in color. Around it on the rolling plateau is a mosaic of open scrub and steppe. Locally small patches of scattered cottonwood mixed with the *Tamara*.

This mosaic continues eastward, along the river to Holbrook, and beyond.

Locally *Tamara* replaced along river by small *Populus*.

East of Holbrook scattered small sandstone mesas and buttes.

Farther east an area

of small dunes, with various measures taken to stabilize them along tracks, including shrub plantings.

Mesas more conspicuous.

Thin snow generally, all snowing.

Eastward large areas of scrub savanna and dwarf scrub savanna, on rolling and slightly dissected plateau country.

At about Arizona-New Mexico boundary the prevailing vegetation changes to an open forest or savanna of *Pinus-juniper*.

Shortly before Gallup a line of west-facing red cliffs, locally cut into beautiful narrow domes and pillars. Almost bare of vegetation.

Toward Gallup the route follows a wide canyon cut in a sandstone plateau. Scrub savanna in bottom, scattered *Pinus ponderosa* in open *Pinus-juniper* on top.

East of Gallup, to north of route very interesting erosion features in red sandstone. Prevailing vegetation open scrub in valley bottoms, open scrub forest or savanna of piñon-juniper on mesas and ridges.

Still thin snow over everything.

Piñon-juniper continues for a long distance eastward, but after erosion features are passed it alternates with large flat or gently rolling steppe.

Snow disappears from all except high slopes near Grants.

Lava beds with open scrub, mostly *Larrea*, east of Grants, in broad valley cut in flat-lying sandstone beds. There have piñon-juniper.

Snow again eastward.

West of Rio Puerco are vast plains to south of track, almost shrubless steppe. To north of track low rolling land, steppe with scattered juniper shrubs. Very little snow.

Lawsonia common along water courses.

This steppe changes eastward to an open dwarf scrub which covers large areas of rolling plain around and northeast of Dallas Jct. Principal shrub seems to be *Artemisia* (cf. *filifolia*?) and possibly *Crameria* sp. Snow is gone from here.

(Probably near Gallup?)

Scattered small *Quercus* appears northward. Some rather old lava beds on northwest side at a distance. A few juniper locally.

A dwarf scrub of varying proportions of *Artemisia*, *Artemisia*, and *Ferocactus riddellii* (?) dominates the plain east of the Rio Grande below Albuquerque. The low ground along the river has open *Larrea* forest. The leaves of the cottonwoods vary from bright gold to dull buff, and from many trees they have fallen. A dull red note is added by what are probably pods of a tree that I fail to identify from a distance. It has small, narrow silvery hanging leaves, also.

2.

Bottom lands above Albuquerque are largely cultivated, checked with high levees and irrigated. *Populus* forest near river. Scattered trees near roads and houses elsewhere.

Thin snow, melted off in places.

Soil fine, gray brown, gullied somewhat away from river.

Slopes at foot of terrace scarp very gentle, upper parts with open *Atriplex* scrub.

Nov. 19 - Flight from Santa Fe to Clovis, N. M. 12000' rt. side of plane.

Mainly plateau country, the first part covered largely by open forest, probably pine, or perhaps some piñon-juniper. No closed forest at all. Areas of very flat ground are bare or grassy.

Eastward this forest becomes sparser, areas of grass become larger and more prevalent.

Erosional features are

interesting. Small remnants of mesa, arrowhead in shape, some skeletonized by headward erosion. This headward erosion is really a rather obvious process, as the cutting power of the water would be proportional to the slope down which it flowed. This can be applied to explain many erosional features. Perhaps there is a limit of steepness beyond which the cutting power lessens.

Toward Clovis the grassland becomes the prevalent feature and trees become more and more restricted to escarpments and the gentle slopes just above them. Near Clovis trees disappear altogether. Small ponds, probably dry during most of the year, are scattered rather abundantly over these plains.

The topography also becomes rapidly less rugged and near Clovis there is almost no relief.

Nov. 19 ~~has~~ Flight from
Clovis N. M. to Fort
Worth Texas. at side of plane.

East of Clovis and
large areas of low
partially or entirely
stabilized dunes. This
country, where not
under cultivation, seems
covered by a low very
thin bush.

In some of the more obvious
of these areas the dunes
are well stabilized except
for localized spots of
activity, which show
up very strikingly.
Low spots where water
collects have trails
radiating out from them.
Here also there is a bit of
~~some~~ wind erosion getting
started.

Through this country
both in the dunes and
elsewhere, low spots are
common, without outlets.
Most of them do not
have any water in them.
Seems quite likely that
either gypsum deposition,
siltation or compaction
by alternate cracking and
swelling could make

the bottoms of such pools
very much more
resistant to erosion
than the surrounding
area, if the whole region
were subjected to rejuvina-
tion.

Eastward cultivation
becomes more and more
prevalent. Some of
the more well developed
of these pools should
be studied. They are
especially striking
just west of Lubbock, Texas,
and ^{one} it does not seem to have
been completely altered.

There are also some, not so
well preserved, east of
the city. Most of them
have been plowed south-
east and east the river
and its tributaries
have cut broad ravines
with vertical sides,
showing that rejuvena-
tion has already started.

East of here the gullies
become much more prevalent.
The soil changes to a
red color and for almost
the entire distance to Abilene,
following the northern of two
apparently dry rivers, is a

wilderness of thin brush and intricate dendritic gully systems.

In the center of this is a ragged rocky knob. It would be of interest to examine this area floristically and to compare it with the grassland that may have existed here before the gullying took place. It would be important to figure out the sources of the present flora and to compare its explosive expansion with the contraction of the prairie flora that it replaced. Also it should be of interest to find if any components were equally at home under both of these contrasting sets of conditions. The brush seems to be mesquite, rather closely spaced but not touching in most places, mostly almost bare at this season.

East of Abilene the country becomes more heavily wooded but probably

still with mesquite, though it is hard to tell from a high altitude. Pines become abundant but are mostly artificial.

The country for a long way eastward from Abilene is a much dissected plain, with much of the flat portion under cultivation. Most of the irregular area loosely wooded or in grass with scattered trees and bushes. The total relief is not much and the erosion remnants are flat-topped.

Eastward the trees change from deciduous to very dark green evergreens. Cultivation becomes less and less common. Cattle trails are common. Areas of active erosion are common and of fair size.

Eastward a fairly large meandering river crossed diagonally. The bluffs and mesas lining its meanders are covered by open evergreen forest.

This and deciduous area east of it probably the East Cross Timbers.

1958 Texas - Maryland

Nov. 21 - flight Ft. Worth to Wash.

southeast of Ft. Worth
and southwest of Dallas(?)
large areas that seem
to be plowed up in gigantic
furrows as with a
gold dredger. What is this?

Thinner says best
time to visit Texas is of
Dallas is April or August.

East of Dallas - large
areas of black soil -
intensively cultivated.
Are these "black cotton soils"?
Deciduous trees along
some ravines.

Dec. 7 - flight Washington - New York

9:15 a.m. left side of plane 2100'

Along as no of Washington
a highway parallel with
it - many patches of
pine woods. Pine abundant
both as substantial angular
patches and as small
groves scattered in the
deciduous woods.

Northeast of Baltimore
toward Anne de Grace
there is no pine. There is
a substantial part of
the total area is wooded.
A few pine patches, all
angular with same

Penns New Jersey 25

pattern as nearby cleared
fields, then very little
more. Streams noticeably
entrenched, at least larger
ones, between Anne de Grace
and Philadelphia.

Practically no pine
to Philadelphia and in
New Jersey between Phila. and
New York.

Flight - "dewild airport Long Island
to Westbury, Scotland - 1:30 p.m.
off side of plane.

Arenaceous area, east
of dewild, covered by suburban
development with small houses.
Extensive area of salt marsh
inside ~~on~~ a long, show bar
island with a steep outer
continuous dune slope and
narrow beach. The salt
marshes are apparently
developed on white sand and
have mostly been closely
ditched with parallel
ditches, exposing the sand
course takes us out to sea
rather soon, so we miss
most of Long Island.


They turned back northwest
over Long Island, then east
along its south side.
There are still considerable

areas of wood and swamp eastward, but very numerous subdivisions some salt marsh along estuaries. Forest seems to be a varying mixture of deciduous trees and pine. In the eastern part is a typical drowned coast line with many V-shaped estuaries, offshore sand islands, bar islands, etc. The forest is in general much cut by roads, usually in a rectangular pattern. The ~~flat~~ long shore bar island on the east has an astonishingly straight and sharply cut outer coast and a rather wide beach.

The inner coast is very irregular and the sound is filled with patches of marsh and shifting sand islands and bars. The island gradually joins the mainland as the sound pinches out. Less development out on the long peninsula to Montauk Pt. but there is some East of here broken

cumulus clouds below with particularly ragged appearance on top, like shredded cotton batting. A rather dirty gray appearance to high clouds low in but to north a vague alto stratus layer. Irregular coastline and distance! details not clear because of cloud patches.

Martha's Vineyard north obscured a union large lagoon or northeast corner, surrounded by a semicircular bar. (is this Martha's Vineyard?)

Nantucket Pt. fairly large, much open beach ("land and woods. An astonishing curved bay or inner side with a cupped coast" ). Wooded dunes

on east side and a large lagoon. Wave cut cliff on southeast corner. Cape Cod to north, not very clear.

Just as sea level cloud layer becomes continuous, more or less level in W but with a cotton batting-like roughness and at some or less regular intervals rounded hummocks rising above this surface which have a slight indefinite inverted v-shape or swell appearance, but not at all regular.

Dec 9 Flight Copenhagen-Düsseldorf
Soils around Copenhagen
airport very black, mostly
plowed, some with green grass.
Low cloud layer with off visibility.

Just before Hamburg a small
cloudy sea area - intensely
cultivated and green.
Several small forest patches
are very curious - look
like an old lake bed, solidly
wooded, surrounded by
a bare beach.

After Hamburg continuous
low beds of clouds - flat-topped
cumulus with closed fissures
or 'intumes' between them about
half or a third of the way we
crossed a curious rather
sharp boundary, curving
somewhat between white
firm-looking clouds on one
side and less substantial
gray ones on the other (toward Hamburg).

Around Düsseldorf brownish
soils, mostly cultivated, little
green to be seen except some
patches of conifer woods, a
little blue grass. Some
fair sized areas of woods
either pure deciduous
or pure conifer.

Düsseldorf to Geneva.

Thin meadows above Düsseldorf.
Thin layers of structureless
stratus cloud, semi-transparent
with several large cumuli
protruding up through it
locally abundant
small cumuli. Visibility
generally poor.

North of the foothills of the
Vosges a wide wooded area.
Deeply dissected by occasional
entrenched streams. Meadows
cultivated except for a few
patches of coniferous forest.
These more abundant and larger
near the mountains, also
the meadows streams
more deeply entrenched and
conifer forest on some of the
ravine walls. In the
cultivated areas not a
hedgerow nor a tree nor a
substantial part of waste ground.
The whole landscape is more
cultivated. ~~There~~ about 75%
in conifer woods 25% cultivated
in grain. In the mountain
small valleys the ridge
between them wooded. Some
cleared plots even high on slopes.
Toward south end of range the
proportion of cultivation is much
greater. Around ~~the~~ base of

Voorges and to summit of Jura a thin dusty looking semi-transparent fog with mountain stretches up through it. South of summit ridge of Jura and in its higher valleys a bed of dense clouds.

Tops of Jura dusted with snow, bed of Jura.

Innumerable plantations on south side of mountains.

Portion of Jura showing above clouds between Jura and Geneva largely wooded, but some clearings or meadows on tops some bare grass cliffs of magnificent size.

In the valley about half way from Jura to Geneva is small area of woods, mostly conifer but part deciduous, covered by ice. Other similar areas not. The east of Rhine!! High Alps to south mostly snow-covered.

No snow on western Jura, at least not visible from south. Toward Geneva ice on trees on wooded hill in valley bottom, even on those on flat ground just a little snow dusted over ground to north of woods.

forer

The high Jura near Geneva have extensive meadowland on their summits and upper slopes. ^{very little} snow on south side, at least.

Around Geneva fields are slightly green, some are to some a high altitude 6-7 main ranges of the Jura are visible parallel, broken by the gaps of the Rhone Valley.

All except the steepest land between Geneva and the higher Alps is cultivated or pastured. Steep slopes wooded. Some hill tops powdered with snow.

Passed Mont Blanc, protruding above the clouds, completely white. Another peak, almost as high just south of it.

Southern part of Alps exposed, great snow fields, only cliffs free of snow.

Italian slopes with rather little snow, thickly wooded in most parts. Visibility poor.

Dec 11 Beirut to Karachi mostly at night. 12,000' high sides of plane, crossed peninsula of Trucial Oman at or just north of ~~Shan~~ ^{forer}.

The west side is a vast

plain of oriented dunes, with ^{small} patches of *Phoenix arabica* between them here and there, especially inland. No other vegetation seen on the otherwise pale sandy plain. Well inland are extremely rugged, nude mountains, a dull pale chocolate brown in color. In a deep valley ~~in the~~ ^{the} Gulf drainage is a fan sized oasis with *Phoenix dactylifera*. In the deep canyons on the east side water can be seen occasionally, with a few small oases. In some of the steep ravines a bit of gray-green vegetation can be seen. Nothing on ridges & slopes. The coastal plain on this side is narrow, but there is a small oasis with a small town, very bleak-looking. This might be taken out looks very small. Complicated series of small paddocks near but not in oasis. Oasis has other plants as well as *Phoenix*, but can't make out what they are. Few or one *Phoenix arabica* on this side of mountains.

A little out from the east coast are lines of a sandy bloom festooning the coast.

The coast of Iran near Chabab, seen from a short distance out at sea, is indescribably barren. It is a dull cream color, like coral sand, rather flat, with almost no vegetation. Two small oases on the peninsula east of the bay where Chabab is located. Chabab seen, trying one of them. The low mountains back of the coast look just as barren as the coast.

Eastward are low abrupt bare hills & cliffs very near the coast.

The mouth of the Jashi River is one of a cluster of stream mouths on the bay west of Ras Jiwani. The country is utterly desolate, but must have had rain just recently, as the streams have water and each has a plume of silt in the sea outside its mouth.

The peninsula east of and culminating in Ras Jiwani has low rugged hills and conspicuous cliffs back of a narrow, long, completely barren flat coastal plain.

It seems to be a cusped coast, the cusps very prominent looking eastward, but somewhat elevated and the tips may be truncate.

Karachi - tidal flats west of river mouth on cusp have apparently a low semi-open mangrove scrub on more stable patches, bare mud in other parts. Same east of river but above the mouth, bushes here mostly low gray ones, some taller green ones. Tidal flats on coast to east mostly bare.

Flat desert east of Karachi with irregularly scattered dark gray green small trees or large bushes and more abundant smaller gray bushes.

Enormous expanses of mostly vegetated tidal flats extending south in the Indus delta.

Calotropis common locally n.e. of airport. *Capparis*? very common.

Areas of thin low dry grass around airport.

Irrigated fields bright green.

At Karachi on foot - some of *Scaevola taccada* seen.

Another with wide ovate leaves dark purplish green above, deep purple beneath, flowers white, dotted with purple around throat, two upper lobes contiguous and somewhat overlapping, lateral spreading, lower narrower and somewhat bent forward (salpigloss). Another with gray green, gray and white variegated leaves. Buds only.

The unknown form of *P. guilfoylei*, ~~which~~ with white bordered leaves. Also a non-variegated form which looks as I remember *P. pinnata* to look. Perhaps *P. guilfoylei* is only a form of *P. pinnata*. All sterile.

Between Karachi and the airport is a profoundly disturbed landscape. Little trail innumerable.

Karachi - Calcutta

Phoenix and other trees around irrigated areas. Indus delta extends south as far as vision permits on such a hazy day. Is this dwarf mangrove vegetation??

Conspicuous dendritic gully systems northwest of Indus delta in desert. Most shrubs have not been seen.

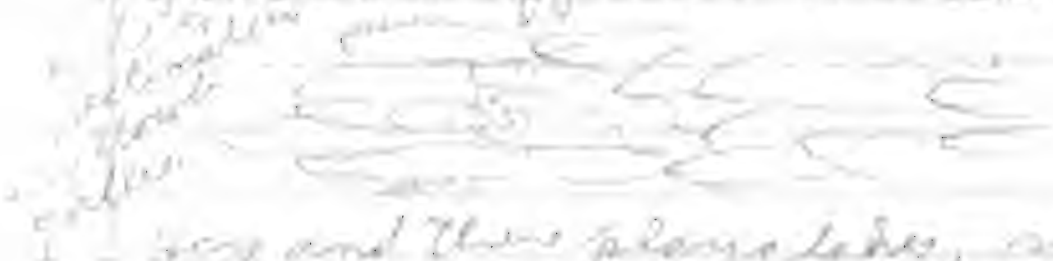
Upper part of delta seems to
lack ~~in~~ vegetation
almost completely. Salt pans.

Northwest of Indus is a desert
landscape, locally completely
barren, locally dominated
by shrubs and (?) small trees.
Large square sections of
greenish black water irrigated
lands to east of it, but some
areas appear alkaline.

Channel and bottom land
of Indus - bottom land mostly
wooded, some grassland and
savanna. Great sand flats
along channel itself. East
of channel alternating
cultivation and woody
vegetation. Some areas appear
to be sand and support a sparse
vegetation. This mosaic
continues for some distance.
The cultivated land, cut up
into small irregularly rectangular
plots by levees, becoming more
and more dominant eastward
to another meandering channel.

Some plots in eastern part with
same pattern east of the channel
for a short distance, then open
desert with varying
concentration of bushes, locally
now, locally small irrigated
areas.

Gulf of Cutch lined with
irrigated land. Some low
with thick spots grown from it
also irrigated. Some areas
apparently too alkaline and
unsuitable for agriculture. All
have evidently been at one
time or another under cultivation,
judging from levees and ditches.
Some areas are very black,
have irregular patches of
vegetation, but look like dried
marshes. Very old dried
river meanders with
intricate patterns. The
actual channels mostly
vegetated, crescent shaped
areas between them with
varied density of natural
vegetation. All of this north
of the Gulf of Cutch. Coloured
a somewhat elevated series
of broken parallel ridges
running N.E. - S.W. - obviously
a dissected plain but the
pattern difficult to understand.



Here and there playalakes, now
dry and bare, surrounded by
scattered trees. General
vegetation of area scattered
bushes. Altered bottom areas.

appear to be or to have been cultivated. This extends a long way, perfectly oriented, little variation. Southward of it is an extension of the Gulf of India, mostly vast flat sand flats, water in center.

Northward of this are vast brownish gray flats almost a wide band of vegetation. These have tracks across them, not quite extending to edges of flats. Small fans of alluvial material extend out onto these flats from ravine mouths. North of eastward extension of this is flat land divided into plots by mud or stone walls, probably cultivated during wet season. This surrounding a massive deeply jointed low mountain of reddish granite. The joint pattern east-west, of hard bushy desert vegetation.

Another much lower mass of this eastward. Part of this more cultivated land and a small village. Then more of the extension of absolutely bare plays flats, surrounding muddy lake with salt margins. Hard even to be sure that this lake has water in it.

East of this vast stretch of desolate mostly gray-brown cultivated land, cut into plots by walls with some trees or bushes between. Villages concentrated in dense villages and towns scattered through this area, each surrounded by a tract of overgrazed pasture land. Going to work in the fields must take a very considerable amount of time. To the south there are some wet spots in this pattern, visible when the low sun hits them.

This landscape becomes slightly greener eastward and seems to develop a slight rolling relief the axes of the undulations north-south. Trees more abundant here in the pasture areas, none in the cultivated areas except on the walls between plots and very few there.

River, probably that running through Ahmedabad. The scarps of the ravines badly gullied. Eastward same pattern of cultivated fields with walls,

scattered villages each with a pasture area, this more wooded than farther west. Landscape greener but still only with a tinge of green. All of this a plain with very little relief.

For undulating or ^{almost} winding ridges, trending southeast, parallel, become noticeable eastward, probably stabilized dune ridges.

Then patches of rocky hills outcropping from the plain, with flat valleys between them. Hills semi wooded, more or less green. Valleys cultivated, with sandy river channels, ^{streambed} streams dry.

Hills more numerous, valleys narrower, everything greener eastward.

Probably the northern part of the Vandyke Range.

From here the country is generally ^{increasingly} rough, with uneven open woods. End of ridges north-south, somewhat in line.

Hills become more densely wooded, ridges stronger, reddish, sedimentary, habitations and cultivation only in main valleys, roads almost absent. Practically no flat land.

Many lakes or reservoirs seen, especially in distance to south, a few along course. End of ridges change to N.W.-S.E. becomes a bit less rugged, much less wooded. An important stream comes winding southward and much flat cultivated land along it. Hills almost disappear. Perhaps the Nabada R. where it turns near Jubbah. Hills still along course but plains along river to south must be Nabada, as it parallels course for some distance to south. Lakes common in its plain.

Fog getting bad, toward sunset, visibility poor.

Vegetation poorer eastward, probably because of overgrazing rather than climate.

Hills disappear along course and to south. Away from rivers country seems sparsely settled but still very poorly vegetated.

Then some scattered low hills with thin woods.

Country gradually hilly again but only in patches or belts, trending north-south, rather barren.

Cultivation increases eastward to south branch of Pon River. After this too dark for visibility.

Dec 10 - Bangkok to Djakarta

Northeast coast of Malaya - Mouth of a large meandering river with meander patterns throughout coastal plain.

Largely a mosaic of rubber plantations, coconut plantations and areas of paddy fields some forest patches. About half of ~~forest~~ area back from coast is in rice, in various stages from green to brown.

Farther inland a large area of rice that ~~are~~ mostly green. Also some inundated land and swamp.

Then mountains which are densely forested. Many clouds, visibility poor.

Crossed another broad valley with a river running northwest, with considerable rice, some rubber, some swamp forest.

Low hills with dense forest. From here on mostly cloudy. But occasional holes showing hills and mountains all thickly wooded, ~~most~~

numerous streams.

After a considerable distance another river running east of northeast, with a reddish sandy bed, some rice in the narrow valley bottom. Then forested hills. Very cloudy.

Then less clouds, a strip of small hills, very intricate, solid uniform rain forest. This over a large area.

After a considerable distance a large meandering river and valley system running southeast. Much rubber and rice in the broad flat bottom. This enters the sea with another coming from the west, and there are large swamps areas near the mouth.

Along the coast a spectacular series of beach ridges and an old shore line, of white sand back of a cultivated area.

Another meandering river of black water, and several black water lagoon and inlets in this cultivated strip.

Coastal plain with white sand and series of old sand ridges, a large muddy

estuary & lagoon. Then much swamp, long-shore channels, some open grassland sandy beach. Coast trends slightly more westward. The ~~sea~~ here is very muddy and of a greenish pea-soup color. A broad complicated coastal plain all along here, but visibility poor. The green color of the sea is more and more conspicuous, almost a grass green. I have never seen anything like this. Extends a long distance from shore, water obviously very shallow. Bottom mottled as great parallel ridges or undulations. Could this be turtle grass? Fills the whole sight of the southern east coast.

Another large river estuary with very complicated channels paralleling coast. Approaching shore again, very muddy. Another large river mouth, extremely muddy. Much rice in its valley. South of it a large lake with many islands of swamp forest.

Low high island offshore appears grassy & covered by low scrub except for trees around

shore. Much cultivated land and a settlement on coastal plain. Vast forest on flat to rolling a low hilly ground inland. A road cutting through the forest, running about north-northwest.

Southward many clearings in the forest, mostly grassy. Some clearing in progress.

Then much rubber land with swamps along streams. Rubber very green at this season. An area of hedge style planting of rubber. Many clearings. Soil where exposed seems to be a white sand, at least in many places.

Then large hilly forested area, extending unbroken for a vast distance. Relief rather slight.

Then many clearings with balang. Large valley almost all more or less cleared and in belukas and many young rubber plantations.

The coast again, with a large river running into it, some clearing in this valley. More old beach ridges around a crescent shaped bay water

pea green. Along south part of bay forest comes almost to beach. Black water streamer coming out of it into middle bay. Mixing conspicuous.

Plane made right angle turn westward. Very flat forest land with some old clearings. Forest becomes very fine. Textured as we approach a great lagoon or estuary. Plantation immediately around estuary, with roads.

Considerable mangrove swamp.

Approaching Johore Strait and Singapore Island. Complicated pattern of rubber plantation, belukar, grass, forest, swamp between estuary and strait. Much new rubber plantation.

Singapore Island - mostly mixture of houses and trees, great red scars. Water reserve forest, some small rubber plantations.

Turned south again. Large islands in west cut by straits, mostly low and wooded.

Southward a maze of islands - tiny ones then the

to grassy with trees along shore. Larger ones wooded but with degraded forest or belukar and much savanna.

Mangrove swamps along with some plantations and new clearings. Channels and estuaries very complicated.

Relief low. Obviously a drowned low hilly relief.

Southward the islets become smaller and sparser, surrounded by dark colored reefs.

Sumatra in distance! Over, a peninsula

extending east and southeast. About opposite this another group of small islands.

Unbroken forest, partly cleared at some time, now a less regrown, partly rather open, some plantation? no better habitations.

Islands and satellite islands sea very green in vicinity. Islands largely wooded but with many clearings, belukar, savanna, belukar, in an irregular mosaic. Mountainous central and southern part still has some undisturbed forest. Apparently some small

tin sunbanger south side
large burned areas on
south coast

A large roughly circular
area of sea is a dull dirty
green color, in contrast to
the blue-green around it.
Bounded by a scalloped
line of white-foam breakers?
not at all clear what
this is from 15000'. Some
patches of bloom south of the
Sumatra in distance.

The above dull green
water evidently merely
a different water mass.
Here are three of different
colors intersecting, not
mixing readily. But
these not outlined in white.
More grass-green sea,
becoming lighter and more
pea-green southward. These
greens are probably merely
due to different depths of
water, but have a duller,
more opaque appearance
than I am accustomed to.
Possibly because of greater
silt content or plankton content.

Large island northward
by clouds, partly cleared, some
roads, plantations.

Approaching south Sumatra

Sea very muddy. Coast low.
Almost entire island under clouds.
Thinner of interior show
dense forest. Some cleared
land along a small stream,
several houses, ~~and~~ clearing
bright green, perhaps banana,
possibly rice but no love pattern.
Some paths visible. These
now forest, vast areas.
Little or no relief. Another island
not very mixed, some trees
lighter colored. This a large
area of smooth canopy
with only few scattered
emergents. Then emergents
become abundant. Then
close to form canopy. A few
trees bare, a few in young
leaf.

Some large rounded clear
spots, bright green, near a
black meandering stream.
Some black areas in green
suggest that clearings may
be marshes. Lower along
this stream, southward, are
obviously man-made clearings
in various stages of regrowth.
Also the forest becomes
more open. Some patches of
savanna. But grass very green.
Southward of island low, wooded
on local very light colored trees.

Rice fields around
Djakarta airport have
villages with coconuts,
Musa, Artocarpus, etc.
Tilted roofed houses. Village
like wooded islands
in green rice.

Dec. 9 - Karachi airport

J 39651

Pseuderanthemum

planted around airport building

shrub 1 m. tall. leaves dark green above, deep purple beneath, flowers white with purple dots around throat. Two upper lobes erect, partly overlapping, lateral lobes spreading, lower lobe bent forward somewhat gibbous.

Dec. 16 - Between Tjiaai
and Tugur

Terraced rice, with
bamboo, bananas, ^{pale fruit} mango,
other tree crops, much
Manihot, Carica, etc. The
rice in all stages from
planting to harvest. Replanted
immediately. Many ornamentals.

sweet
potatoes

Some Cyathea and other
wild plants on ravine walls.
Above Tugur same pattern
along roads. Tea planta-
tions on slopes. Little shade.

Dark brown soil, 1-2 m.
deep.

Tea height 1-1.5 m.

Forest on tops of some
hills.

Rice + village complex drops
out very soon after Tugur.

Puntjak Pass - 6 photos (5) -
tea plantations with very
little shade. Some with a
gray appearance because they
are trimmed back very drastically.

On other side of pass the
tea drops out soon and is
replaced by rice, Manihot
& garden complex.

Tjibodas

From 4500' up, a lower
montane rain forest -
trees widely spaced,
canopy irregular
and rather open,
emergents to at least 40 m.

Altingia, ^{small} Castanopsis,
Dioscorea,

No noticeable stratification bet. ^{small} layer
Asplenium nidus and
other epiphytes common,
thin but continuous
moss cover.

Undergrowth layer to 4-5 m.
Pinanga kuhlii, Calamus,
Plectocomia, - very irregular

Dense ground layer of
ferns and various herbs.
rocks mossy.

Photos 5 new, 3 red. at 4850'.

At 5000' large Podocarpus
imbricaria come in as
emergents.

Persea ~~leuca~~ rimosa

Throughout this forest
lianas are present but
not in great abundance.

At 5500' 5 photos + 1W

Here tallest tree perhaps 30-35 m.

Just below waterfall
is an area where the forest
has been destroyed by ~~the~~ a
~~waterfall~~ mud flow
during an eruption
2 years ago. A few scrubby
trees ~~survived~~ survived,
but most are dead.

In one place where a section
of this mudflow is exposed
it is about a meter thick
and looks like glacial till.

Shrubby vegetation has
come in sparsely, including
Vaccinium, *Leptospermum*,
etc.. *Nertera* is common.
Repenstria seen. Some
cane, apparently *Saccharum*,
though the branchlets
do not dicastisculate
properly.

Dec. 16 - Above Tjibodas,
in rather open lower montane
rain forest

~~29652 Nephrolepis~~

39652 Nephrolepis
abundant on tree trunks

53 Podocarpus imbricata Bl.
common

54 Drymaria
occasional along trail in

55 (few)
common on tree trunks

56 Usnea
common on twigs of emergent trees

57 Ophioglossum
very local between rocks of trail

58 Lasianthus
occasional in undergrowth
along trail

59 (clasts.)
rare along trail

60 Nertea gracilens (L.f.) Druce
rare on mossy rocks

61 Ophiomphala
common on stones along trail

62 Ophiomphala
rare along trail

Dec. 16 Below Tjibodas Waterfall
in open almost completely
~~destroyed~~ lower montane
forest almost completely
destroyed by mud-flow
2 years ago, very open

5510'
1092m

for rhizome closely appressed
to tree trunk, fronds pendent.
very tall emergent tree
(twigs picked up from ground)

(picked from ground)

semi-scandent shrub
3-4 m. long

small tree or large shrub,
fruit black when ripe.
prostrate, flowers
yellow-green, fruit
translucent vermilion.
stem green, flowers white.
stem purple

Polypodium

common, terrestrial, in open.

Pratia montana

occasional, in low bushes

Laccharum?

common on open stony ground below falls

~~*Nertera*~~

Nertera granadensis (L.f.) Druce

common on rocks and fallen tree trunks, in open.

Parmelia

common on ground in open.

Davallia

occasional on fallen logs in open

scrambling, flowers

purplish blue

caespitose, irregularly ascending upper blades on flowering culms reduced.

prostrate, firm,

flowers greenish yellow,

fruit translucent

vermillion

bright green above,

white beneath.

very coriaceous.

Dec. 18 - Trip Bogor to
Udjung Kulon by bus + boat.
Around Bogor is a pattern
of dryland garden cultivated
and terraced rice.

Lower down, toward Djakarta
on flatter ground, are some
small rubber plantations
and even some pasture, but
still mainly gardens and
rice.

In the gardens are

Cocos, Musa, Citrus,
jack fruit, bamboos, manihot,
mangoes, peanut, sweet potato,
Cela, Piper batle, guava tree,
Carica, Phoenix dactylifera (1),
tamarind, Muntingia, Anacardium
sugar cane

Ornamentals:

Acalypha amontacea.

Alacasia macrophylla

Jatropha curcas

Carpa hybr. Coleus sp.

Delonix regia

Caesalpinia pulcherrima

Dieffenbachia maculata

Catharanthus

Thesetia peruviana

Sponsea erecta

Lambucus sp.

Hibiscus tiliaceus

Gliricidia sepium

Allamanda hendersonii

Codiaeum variegatum

Leucaena glauca

Zephyranthes rosea

Zephyranthes candida

Thunbergia erecta

Tobermoutana coronaria

Hibiscus hybrid.

Nerium oleander

Filicium?

Samanea savana

Casuarina

Bougainvillea sp.

Pedilanthus tithymaloides

Erythroxylon sp.

Clerodendrum thomsonii

Averrhoa bilimbi

Gerbera jamesonii

Tagetes

Solidago sp.

Malvaceae

Cupressus sp.

Plumeria obtusa

Plumeria rubra

Caladium bicolor

Polycia scutellaria

Scindapsus aureus

Euphorbia sp.

Chrysanthemum indicum

Hymenocallis littoralis

Hibiscus schizopetalus

Pisonia alba

Ornithoglossum

Antigonon leptopus

Polycia guilfoylei

Passiflora quadrangularis

street trees in Djakarta

Mangifera indica

Delonix regia

Artocarpus heterophyllus

Rosptonea regia

Ficus benjamina

Muntingia calabura

Thouecia peruviana

Tamarindus indica

Thuja sp.

Agathis sp.

Casuarina sp.

along canal west of Djakarta

Thunbergia erecta very common.

Jatropha gossypifolia occasional
(widely spread in Java, acc. Kostermans)

Sesbania grandiflora occ.

(fl. eaten, acc. Kostermans.)

Tangerang - enormous market.

~~road~~ ^{road} - along road

Sweetenia macrophylla

Cassia siamea

Cosmos nucifera

Hevea brasiliensis (small
plantations)

Pantana camara and
Ananas comosus common
in bledjerows.

Metroxylon swamps.

Hibiscus macrophyllus

Rice is cult. here but
adverse

by no means as abundantly
as in most places we
have seen. Cassava
and pasture and villages
share ground with rice.
Then some large open
areas of rice.

Streams very muddy.

Some rather rolling open
area. Apparently poor
soils. Large uncultivated
areas, with low scrub
some parts in rice and
rubber.

Scrub of *Melastoma*,
Fagraea, *Lantana*, etc.

Then almost solid rice,
some *Metroxylon* swamps.

Leaves used for thatch,
trunks very little used for
starch (acc. Kostermans).

Trunks reach 4 m.

Soils here (planosols?)
light gray when dry,
darker brownish gray when
wet.

Throughout this part
of Java the rice is headed
and the bouquets of
panicles are dried in the
roadside.

Serang - much more open,
less crowded than the
west. Large to medium trees.
Turn southward. Coconuts
abundant. Mangoes + Achras.
Some areas of *Imperata*.
Thickets with *Gleichnia*.

Pandeglang

Volcano to right - still has
some patches of forest
on higher and rougher parts.
Parts of slopes grassy
with only scattered trees.
Turn westward.

Garden complex.

Gnetum gnemon very common,
small trees with narrow
crowns.

The typical complex of
trees, gardens, houses, etc.
from Bogor to Djakarta
and to Pandeglang is
dominated by mango
pale-fruit and coconut.

At Pandeglang it changes
and is a complex of coconut,
Achras and *Gnetum*.

This is the pattern to Labuan
where *Croton* becomes
dominant and along the
coast forms a pure stand
(photos).

Mts. north of Labuan
are cleared up to half
or $\frac{2}{3}$ of the way to top,
secondary forest for the
rest of the way.

A small island
s. w. of Labuan seems
to have relatively undis-
turbed forest.

Krakatau can be seen
to the n. w. rather too far
to distinguish surface
features. Ana Krakatau
is a perfect cone, about
like Alamagan. 7 base bits
of Old Krakatau to right. Low
explosive activity from the
sea (?) to right of base of
Ana K. columnar bursts
either white or black, every
few minutes, rising higher
than Ana K.

Another double cone m. w.
to the right, is not part
of Krakatau group.

Coast of Java, to left,
fringed by low islands,
these appearing practically
undisturbed.

Dec. 19 - Pulau Pentang, island
off shore of Ujung Kulon, west extremity
of Java.

Inner beach has a
fringe of *Sophora tomentosa*
to 3 (4) m. tall, replaced
here and there by *Vitex* sp.
and with a little *Scaevola*.
This fringe is backed
by a wall of *Calophyllum*
inophyllum, with
occasional *Hernandia*, etc.
Tournefortia rare in the
fringe. The *Calophyllum*
wall is several trees
wide. Inside this is a
belt of *Ficus* and other
species. Then a wide
mixed forest.

The soil is black, but
further inward gets
lighter.

The mixed forest has
trees to 30 m. tall, the very
large ones rather widely
scattered, mostly buttressed,
and sizes more or less
regularly graded down
to about 1 inch in diameter.
Then very few saplings
between this size and
a foot or so tall.

This stretches over a
considerable flat.

The soil is so
compact that water
has evidently stood
in it. The ground layer
of seedlings is very
sparse. Almost no
herbs.

Then an elevated
terrace about 15 m.
with a much thicker
forest, generally
smaller trees, many
more lianas. The flora
here is far richer and
there is a more noticeable
ground layer, still largely
of seedlings. Some ferns,
but these mostly on fallen
tree trunks, where there
are characteristic commu-
nities of seedlings and
ferns. In one place
a very large tree had
fallen, knocking down
several others, which
in turn knocked down
others, making a swath
well over 100 m. long.

This limestone terrace is
rather compacted or weathered
and silted up, so there
is some gully erosion and
water trickling over impervious
layers in the bottoms of ravines.

At beginning of cliffs on ~~inner~~^{west} side is an eroded terrace probably 6' with curious rimmed basins, and a series of exposed beachrock, exposed by removal of terrace 13 ~~feet~~ dipping landward (Photos as in. & Kod.)

Small islet has *Panaphis* on one end. (Photos)

Beach beyond the terrace above is of gravel, is obviously being cut back, but there is a gravel ridge in places very coarse. The vegetation here and just back is a tall forest of large *Barringtonia* and *Hernandia*. Along the coast this ^{combination} is dominant but in sandy places there may be *Calophyllum*. *Pandanus* thickets here and there. *P. tectorius*. *P. fragrans* seen once here, on rocky material.

Back of the top of the beach ridge the forest is largely *Barringtonia*, but with considerable *Hernandia* and *Occhrosia*. Locally but abundantly a thick shrub to sapling sized lower story

of *Ardisia* and *Aglaia*, with occasional young *Barringtonia*. Low thickets of *Pandanus* mixed with this. However, in most places one can walk freely. Fallen trees form the worst obstruction.

The ground is mostly pebbles and cobbles, in places masses of boulders.

The beach ridge has cut off areas of low-lying ground that support a stand of *Sumnitiza racemosa* growing to a height of 10-12 m., with abundant pneumatophores.

Along the gravel ridge are scattered *Panaphis* and *Tournefortia* trees, much less abundant than the *Pandanus*.

Hibiscus tiliaceus is fairly common, *Thespesia* much less so. *Allophylus* occasional to common. Most of these species grow out over the water, making walking along the beach difficult.

The flat land back of the sandy beach has no significant number of boulders. Some exposure of what may be an old platform near the beach.

But on the other side of the island, the narrow flat zone there has great masses of boulders and rubble, presumably thrown up by the 1893 tidal wave from Krakatau. Likewise, on the flat around the southwest side where the ~~beach~~ bridge is of gravel, there is much gravelly and bouldery rubble back on the flat. The tidal wave

must have swept around the end of the island and picked up considerable material and carried it inland.

From the channel the vegetation of the island looks of remarkably uniform height until the southwest corner is reached. Then it becomes very irregular.

The sandy beach ^{flats} generally supports a good forest of *Calophyllum*, fringed by a fringe of *Sophora tomentosa* and *Vitex*, with occasional patches of *Pandanus*, ^{by the way of} *Scaevola*, *Tournefortia*, ^{Hernandia, Hibiscus,} etc.

The gravelly beach ridge supports principally *Hernandia* & *Barringtonia*, with some *Occhrosia*.

Along the front are occasional bushes or small trees of *Cemphis*, *Calophyllum*, *Justicia*, *Tournefortia*, etc.

No herbaceous growth except on sandy beaches where there has been disturbance, where one sees *Ipomoea pes-caprae*, *Stachytarpheta jamaicensis*, *Thespesia*, etc.

Dec. 18 - Voljany Kulon Recent
across from Pulau Bentang
Island

Beach ridge, back
of which is a swamp
of *Nypa* and *Sonneratia*
alba? *Nypa* abundantly
flowering. Buds are
distinctly warm when
pressed to cheeks. The
tips of the leaflets bear
long filaments, connected
along the margins at
first, then stiffly spreading.
The pneumatophores
of this *Sonneratia* are
more narrowly conical
than those of *S. caseolaris*.

Back of the *Nypa* swamp
is a strip of rather
swampy with various
trees, but an abundant
understory of rattan.

Back of this a palm
forest, *Arenga*, *Onocarpus*,
etc. along a small stream.

Back of this two large
clearings with grass,
various secondary
weed and shrub species
and scattered trees.

In one pasture was a herd
of 9-10 banteng. In the other,
4 sambar deer, one herd of 7

banteng, another of
4. Hornbills flew over.
2 jabs (??) strikes. Jungle
fowl. Many flying foxes
coming to visit the *Sonneratia*
trees.

Dec. 19 - Cape Sarjan
(Java's East Point)
Rocks at ultimate
point bare - probably
Silicite, but stained
black by algae.

One small abrupt islet
with some thin grassy
vegetation. Back of
bar rock on mainland
low scrub and grass
mosaic, undoubtedly
maintained thus by
banteng grazing, probably
rhinos also.

Back of this is low
scrubby forest, rather
tangled, this giving
way to higher forest
back toward landing.

Dec. 18 - Pulau Pentjang (island)

off of Ujung Kulon,

Dense wet forest on coral limestone substratum.

39669 *Tournefortia argentea* L.f.

occasional & rare in scrub at top of beach.

70 *Vitex*

common, forming fringe at top of sandy beach

71 *Ipomoea pes-caprae* L.

common locally on sand in disturbed places at top of beach

72 *Scaevola selices*

rare at top of beach

73 *Sophora tomentosa* L.

dominant in fringe at top of sandy beach

74 *Hibiscus tiliaceus* L.

common on edges of forest at top of beach

75 *Cassytha filiformis*

common locally at top of beach, parasitic on *Sophora tomentosa*.

same, exposed stony beach

76 *Barringtonia asiatica*

dominant in forest on stony ground back of beach

77 *Hernandia sonora* L.

codominant with *Barringtonia* on stony ground at top of beach

shrub 2.5 m. tall; leaves fleshy, frosty green; flowers white; fruit not mature.

shrub 3-4 m. tall; flowers lavender

prostrate, branches erect.

shrub 2 m. tall (others seen to 3-4 m.); flowers white.

shrub 3-4 m. tall; flowers bright yellow, scarcely any flowers.

semi-scandent tree; flowers bright yellow. (unopened at 6 a.m.).

stems soft, green; flowers white.

large tree.

large tree, fruit inflated, mouth of envelope without teeth.

- 39673 *Ochrosia oppositifolia* Lam.
common in forest at top of beach
- 74 *Allophylus cobbe* Bl.
common at top of beach
- 80 *Premna obtusifolia* R.Br.
occasional at top of beach
- 81 *Pemphis acidula* Forst.
occasional at top of beach
- 82 *Euphorbia chariassensis* Wils.
very local at top of beach
- 83 *Croton*
occasional at top of beach
- 84 *Guettarda speciosa* L.
occasional at top of beach
- 85 *Ardisia (humilis?)*
abundant in forest
just back of beach
and at tops of low cliffs
- 86 *Isara?*
rare in edge of woods
at top of beach
- 87 *Aglaia elaeagnoides* Benth.
abundant on exposed
top of low cliff.
- 88 *Fernbristylis cynnosa* R.Br.
abundant at top of cliff
same - inland on elevated limestone
- 89 *Tabernaemontana*
rare in undergrowth
- 90 *Croton*
rare in undergrowth
- 91 *Drymoglossum?*
common on fallen tree trunks

small tree, lactiferous,
buds flowers and immature
fruits in same inflorescences.
large shrub; flowers
white; fruit orange-red.

broken tree; trunk 20 cm.
diam. sterile
branched at base; stems
ascending; glaucous green.
large shrub, 3-4 m. tall.

large shrub 4 m. tall;
flowers white.
shrub 3 m. tall; fruit
immature, pinkish green.

slender shrub 2 m. tall,
buds white.

shrub 2 m. tall.
buds yellow.

loosely tufted.

shrub 2.5 m. tall;
flowers white.
large shrub; ♂.

leaves fleshy.

39692 (Euph.) *Trigonemora?*

occasional in undergrowth

93 *Pelea*

rare in undergrowth

5 94 *Vavaea palm-banica*
very rare in under-
story of forest~~95 *Pteris*~~in high forest on
low-lying flat3 95 *Pteris*
on fallen tree-trunk1 96 *Asplenium*
on fallen tree-trunk2 97 *Eurychorda javanica* Bl.
rare in undergrowth1 98 *Cleistanthus* ??
rare in forest floor12 99 *Garcinia dulcis* (Roxb.) Kurz.
occasional in lower story

- same top of sandy beach

139700

Hernandia sonora L.rare in fringe of forest
(more common on rocky beach)shrub 2.5 m. tall; flowers
yellow.stems erect, to 3-5 m. tall,
armed with vertical
rows of prickles with
broad base; sterile.slender tree about 10-15 m.
tall, 15 cm. dbh. sterile.
(only tree known)rhizome very short,
erect.large shrub or small tree,
fruit immature.
flowers green.small tree; latex yellowish
very slow-flowing from
cut in trunk; fruit immature.

shrub 3 m. tall.

Dec. 19 - Cape Lajar

edge of forest back
of beach

- 39701 *Reea sambucifolia*?
common in undergrowth;
02 *Cordia myxa* L.
common in cleared
roadway.

- 03 *Pyrostegia lanceolata*
common on tree trunks
04 *Hedyotis albido-punctata* (Wend. Fr.) ?
common in grassy cleared
area, grazed by wild oxen.

open areas on rocks
above sea shore

- 05 *Ipomoea littoralis* Bl.
occasional
06 *Cyperus*
local in rock crevices
07 *Phyllanthus*
local in rock crevices
and weedy places.
08 *Ischaemum muticum*?
very common in grassy
areas grazed by wild oxen.
09 *Justicia*
local just back of
sea shore in open places
10 *Cyperus hyllingii*
local in weedy places.

shrub 2.5 m. tall.
fruit immature brownish.
small tree about 8-10
m. tall; fruits dull
pinkish, juice very
glutinous. said to
be used for glue.
leaves leathery-fleshy.

prostrate; corolla white,
salverform but with
globose tube, scarcely
any odor when broken.

prostrate, trailing; flowers
bright magenta-purple.
tufted; spikelets pale green.
erect.

prostrate, panicles
erect.

erect shrub to 1 m. tall;
flowers very rare dull
whitish.
heads white

397 11 (amer.)

- 1 rare in weedy place at foot of cliff.
- 12 12 *Echaeolum* sp. (intermedium?) abundant on cliff of volcanic tuff.
- 12 13 *Fimbristylis cymosa* R.Br. common on cliff of volcanic tuff.
- 12 14 *Jussiaea* common on cliff of volcanic tuff.
- 12 15 *Hedyotis albido-punctata*? common in crevices of cliff of volcanic tuff.
- 3 16 *Ficus* (lower rays 7-septies, but does not have ribbed fruit) common in edges of thickets just back of shore.
- 3 17 *Andisia* (humilis?) common in thickets just back of shore.
- 1 18 *Randia* rare in thicket just back of shore.

erect.

branched at base.

loosely tufted.

forming loose mat, culms erect from prostrate bases. leaves very fleshy; corolla white lobes patent tube globose. large shrub; tips green depressed globose, definitely not ribbed.

erect shrub 3 m. tall; fruiting branchlet, articulated to main stems, but not detaching readily; flowers dull magenta purple; fruits immature. erect shrub 2 m. tall, with drooping & erect branches; flowers dull yellow.

Dec 20 - Port-au-Prince, Haiti

Persea acidula
good stand on small coral
gravel. seedlings on gravel
beneath.

Guettarda speciosa
Hibiscus tiliaceus
Thespesia populnea
Pasmodium umbellatum

Drymaria
Pyrosia
Cassytha filiformis
Cuminum

Ardisia (humilis?)

Lantana camara

Cayratia

Pisonia obtusifolia

Wedelia biflora

Navallia solida

Acrostichum aureum

Cycas circinalis

Pandanus tectorius

Desis trifoliata

Ilex (in Parrotia)

Ilex sambucifolia

Mangifera indica

Ficus gibbosa

Nephrolepis himantula

Hedyotis biflora

Macaranga lanarum

Bidens tomentosa?

Buchanania floribunda

Glochidion

Ciba pentandra

Leucaena glauca

Annona muricata

Psidium guajava

Musa sapientum

Carica papaya

Peperomia pellucida

Acalypha indica

Pteris caudata?

Ananas comosus

Ageratum conyzoides

Sporobolus diander?

Eragrostis amabilis

Piper aduncum

Neonaxia

Eucalyptus spontaneum

Morinda citrifolia

Scaevola sericea

Fimbristylis cymosa

Eupatorium

Gomelina

Lolanthus sp.

Euphorbia hirta

Chrysopogon aciculatus

Stachytarpheta jamaicensis

Ficus septica

Rademacheria gigantea

Hernandia

Ficus palmata

Blumea balsamea?

Andropogon

Oberonia

Valeriana amabilis

Jatropha gossypifolia

Cassipourea frutescens

Sonneratia
Antisia bayana
Goats rue
Eupatorium balsamum
~~*Antisia*~~
Alternanthera versicolor
~~*Antisia*~~
Digitaria 2 sp
Calceolaria argentea
~~*Antisia*~~
Mirabilis jalapa
Cosmos sulphurea
Ipomoea lanuginosa?
Rhizophora apiculata

Forested ~~for~~ border, mostly
 strand species. Cultivated
 area around houses. Then
 a large open area covered
 by a ~~thick~~ scrub about 1-1.5 m
 high of *Lantana camara*,
 pale green in color, but
 flowering and occasionally
 fruiting. Some *Blumea* here,
 scattered *Ardisia*.

In the interior, somewhat
 surrounded by the scrub,
 are several exposures of
 "forest" with thick woods
 of *Buchanania*, *Rademacheria*,
Glochidion, *Ficus septicus*,
F. gibbosa, *Morinda citrifolia*,
 etc.

Other small islands
 largely mangrove -
Rhizophora around
 edges *Sonneratia* in
 interior. *Pemphis* on
 gravel banks.

On the mainland is a
 broad flat, with an
 extensive pasture, mostly
 in *Chrysopogon aciculatus*,
 with clumps of *Lantana*,
Eupatorium, *Ardisia*, *Guava*.

scattered *Lagerstroemia*
 trees and *Corypha*

Herd of over a dozen Bantangs
 and about a dozen deer.
 Bantangs 2 colors, dull
 brown and red-brown.
 Perhaps sex difference?

Dec. 19 Tendong Kalund

- 39719 *Desmos cochinchinensis*
in ~~so~~ thicket at edge of pasture
- 20 *Cudrania javanica*
occasional in cleared game pasture
- 21 *Fimbristylis cynosu*
top of sandy beach, open.

Dec. 19 Pulau Handeuleum
low coral islet.

- 22 *Smyntha* ^{negativa}
local in Pemphis forest
on small gravel just
inside beach
- 23 *Pemphis acidula*
dominant in forest on
small gravel flat just
inside beach
- 24 *Thunbergia*
small patches in
Pemphis forest not far from beach
- 25 *Blumea*
occasional in bantang
scrub on very thin soil
- 26 *Bridelia*
occasional in forest
- 27 *Glochidion*
common in forest and
forest edges.

climber, flowers yellow,
turning green; leaves
slightly glaucous beneath.
lactiferous depressed
shrub, sterile. Dwarfed
form from pasture.
densely caespitose.

prostrate vine,
not lactiferous, sterile.

small tree, ~~flower~~
5 m. tall; grayish green;
flowers white.

prostrate, forming
thin mat; floriferous
culms erect.
herb 2 m. tall, very
aromatic; heads yellow.

semi-scandent
shrub 3 m. tall, leaves
slightly glaucous beneath,
sterile.

small tree; fruit green,
seeds red.

- 3978 *Ximenesia americana* L.
near outer beach in forest
- 29 *Digitaria*
common around dwelling
- 30 *Digitaria*
common around dwelling
- 31 *Digitaria*
common around dwelling
- 32 *Tacca palmata*
common in stony trail
in shade
- 33 *Smilax sonchifolia*
occasional ~~at~~ in grassy
place around dwelling
- 34 *Exora*
common in undergrowth
- 35 *Desmodium umbellatum*
very common in undergrowth
- 36 *algae*
parasitic on *Tacca palmata* leaves.

Dec. 22 - Pasir Putih

- 37 *Aegiceras corniculata*
pure stand on basaltic
rocks covered by salt water
at high and medium tides.
- 38 (sample?)
on basaltic rocks well above
~~at~~ tide level
- 39 (sample?)
on basaltic rocks well
above high tide
- 40 *Hibiscus liliaceus*

shrub; fruit immature.

flowers purple.

flowers purplish.

shrub 2 m. tall,
flowers white, ^{fruiting} fruit black.
shrub to 3-4 m. tall,
flowers white, fungaceous,
causing necrotic spots.

shrubs 1.5 m. tall, leaves
thick brittle. flowers white;
fruit immature.

scandent; flowers white.

lactiferous vine; flowers
dull yellowish white.

rather erect tree, 5 m. tall, flowers
bright yellow fading reddish.

Dec 70 - Krakatau Volcano
 Krakatau^{213m}, Verlaten^{187m}, Lang^{142m},
 and Anak Krakatau^{135m}.
 (Lebeni in background) (photos)

The three older Krakatau islands are arranged like Mang, and indeed would be very much like it except that Krakatau itself is so much higher.

Anak Krakatau is in a state of continuous pulsating activity, with an explosion every few minutes, throwing ash to considerable heights. There is a large crater and smooth ash slopes, dark brown in color down to low wave cut cliffs, except at one end where the slope ends at beach level. Apparently some coral debris has been cast up here, as the top of the beach is light colored. Here a small patch of Casuarinas have reached tree size. A few are scattered on the slope, fair sized but only 3 or 4 in number.

The three outer islands are well wooded except on the steepest cliffs, which are mostly grassy

but locally completely bare. The material of these, where exposed, is very light colored and bedded. The bedding is in places irregular probably because of slumping.

The forest on Krakatau is luxuriant to the top. Casuarina is an important component, mostly in patches. Terminalia catappa is perhaps the most important in terms of area, covering much of the lower slopes. However there are a good many species and the forest is generally a dense mixed forest. No grass now except on the steep inner wall.

Dec. 21 - Pasir Tuf Bogor - Bandung
 w. of Bandung rice -
 fertilized and straw is
 rotted and incorporated
 into soil. Elsewhere burned
 and ash incorporated.

Here are conspicuous areas
 of coconuts with understorey
 of bananas.

Very large very flat
 area entirely devoted to
 rice. Limestone outcrops.
 Old coral reefs. Either an
 old lake bed or inland sea.

Limestone mts. almost completely
 deforested. Veg. of *Leucaena* and
Scaevola spontanea, etc.

Infestation of *Oryctes* on
 coconuts at Padalarang, w. of
 Bandung.

Bandung - Lembang.

Large plain, old lake bed
 surrounded by mountains,
 all in rice, except around villages.
 Where road goes through mountains
 is a deep winding gorge
 with traces of forest on its
 walls.

6 km. beyond Tjimalaka -
 photos of rice landscape & children

Farther on are ranges of limestone
 hills and peaks. The lower slopes
 of these are covered by planted teak.

forest. Teak said to have been
 introduced \approx 1000 years ago.
 Bands of *Leucaena macrophylla*
 planted with teak for fire
 control. *Acacia auriculiformis*
 planted on very degraded
 soils. These soils in
 limestone region are called
 "marl" soils.

Marul Hills - very steep
 and rugged, limestone, entirely
 deforested, covered by *Imperata*
 which is not very luxuriant.

Tjirebon Plain - secondary
 vegetation of *Leucaena*, and
 waste spots is largely bamboo.
 East of Tjirebon along the
 coast Borassus appears.

In this plain mostly rice
 is cultivated, but some
 sugar cane. Near coast
 waste spots dominated by
Leucaena glauca, but these
 are few waste spots. Roads
 lined with *Tamarindus*,
 mostly more or less pollarded.
 A few km. ^{east} ~~west~~ *Opuntia*
 appears along roadside.

Large areas of paddy land
 fallow and grazed by water
 buffaloes. Low lying plowed
 and planted.

About Gebangilis *Oryctes*
 damage to coconuts conspicuous.

Valley low lying mostly drained
flat back of east dominated
by sedgewood hollow. Many
vegetables cultivated here.

East of Tegal are plantings
of *Lesbania grandiflora*. Lvs.
fed to goats. flowers to people.

About 50 km. W. of Kendal
starts a region of low hills
with well grown teak
plantations, some being cut.
Ringed 2 years earlier to kill
trees.

Small *Metroxylon* swamps
here in ravines. Much
bamboo in waste spots.

Insects damage at Kendal.

East of Semarang the
country is hilly, cleared,
with scattered coconuts,
a few secondary thickets,
grass, scarcely any rice.
Eastward rice gradually
appears. Apparently water
is controlling factor. Marshes
planted where not enough
water for rice.

To eastward and southward
a number of volcanoes are
scattered about the landscape
some are active.

to the

teak, and
and to go
our during dry season.
Clean-felled, all coppice

THE HISTORY OF THE

REIGN OF

1. The first year of the reign of King Henry the First.
2. The second year of the reign of King Henry the First.
3. The third year of the reign of King Henry the First.
4. The fourth year of the reign of King Henry the First.
5. The fifth year of the reign of King Henry the First.
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19. The nineteenth year of the reign of King Henry the First.
20. The twentieth year of the reign of King Henry the First.
21. The twenty-first year of the reign of King Henry the First.
22. The twenty-second year of the reign of King Henry the First.
23. The twenty-third year of the reign of King Henry the First.
24. The twenty-fourth year of the reign of King Henry the First.
25. The twenty-fifth year of the reign of King Henry the First.
26. The twenty-sixth year of the reign of King Henry the First.
27. The twenty-seventh year of the reign of King Henry the First.
28. The twenty-eighth year of the reign of King Henry the First.
29. The twenty-ninth year of the reign of King Henry the First.
30. The thirtieth year of the reign of King Henry the First.

LIST OF SPECIES

1. <i>Amphispiza bilineata</i>	2. <i>Amphispiza bilineata</i>
3. <i>Amphispiza bilineata</i>	4. <i>Amphispiza bilineata</i>
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99. <i>Amphispiza bilineata</i>	100. <i>Amphispiza bilineata</i>

Valley containing narrow stream, flat back of east, dominated by ridges when follow. Many vegetables cultivated here.

East of Tegak are plantings of *Pesbania grandiflora*. Lvs. fed to goats, flowers to people.

About 50 km. W. of Kendal starts a region of low hills with well grown teak plantations, some being cut. Ringed 2 years earlier to bulb trees.

Small *Metroxylon* swamp here in ravines. Much bamboo in waste spots.

Onyites damage at Kendal.

East of Semarang the country is hilly, cleared, with scattered coconuts, a few secondary thickets, grass, scarcely any rice. Eastward rice gradually appears. Apparently water is controlling factor. Maize planted where not enough water for rice.

To eastward and southward a number of volcanoes are scattered about the landscape. Some are active.

Dec. 22 - ~~Solo~~ - ~~Solo~~ -

In the palace grounds at ~~Solo~~ a bright yellow flowered form of *Turnera ulmifolia* is planted as an ornamental (looks like the one in Malé!).

Ficus kurzi (*F. benjamina* but with aerial roots) planted as sacred tree - beautiful examples, surrounded by walls - bangyan habit.

Muntingia perhaps the commonest street tree (also seen very commonly yesterday in most towns and villages.) Fruit, said to be much eaten by children.

20 year old teak plantations east of Solo (photos). Tall straight trees. Shrub layer of coffee from trees cut out by thinning left to cut down fire hazard. Undergrowth of *Lourea* in some parts, planted with teak, to cut down fire hazard and to protect soil from sun during dry season. Clean-felled, all coffee

pulled out by roots, used for firewood. Replanting by seed. 4 seeds planted, best seedling selected. Teak forest a complete government monopoly. To cut a teak tree in downyand permission required from forest officer. All teak land (2000000 acres) government owned. 10-15% of teak timber exported.

Soils east of Solo for some distance seem to be mostly regur (black cotton soils).

Rivers and streams through this area very muddy.

East of Solo the villages are surrounded by rows of thorny bamboo. East of Madura bamboo practically dominates the landscape.

Flat-topped *Acacia tomentosa* becomes prominent, said to be spontaneous. Tamarind still lines roads. Coconuts much less common here. Rice is dominant through this entire area.

Near the sea, in the vicinity of Pasuruan *Opuntia* and *Borassus* reappear. Soil is black.

Wanung, set Pukolinggo, pending. Limestone bluff overlooking sea degraded scrub of *Opuntia*, *Lantana*, *Patropis*, *gossypifolia*, *Ficus*, *Melia*, and a dry grass, possibly *Ulatia*. Eastward along coast toward Pasirputih the bamboo around the villages becomes very scarce.

At Pasirputih the sand of the beach is almost black with an admixture of white coral sand. The rocks coming down and forming the point are iron gray pillow-basalts, apparently a thick flow. The surface weathers darker than the normal color of the rock.

Teak forest with dense undergrowth here.

Dec. 23 - Pasirputih

fire climax forest on basalt slope - *Schlercheria*, *Albizia lebbioides*, *Homalium tomentosum*, *Leborenia*, *Flacourtia*, *Uraria*, *Lantana*, *Syzzygium*, etc. Trees rather scattered, shrub layer continuous. *Lantana* dominant in shrub layer.

Part of it less degraded, with more or less continuous layer of trees, incl. *Proteum*, *Sterculia foetida*, plus those mentioned above.

(Driest region in Java - rain less than 1000 mm. in a wet season of 2 1/2 mo.)

Here the undergrowth is thick. ~~Almost~~ Many of the trees lose their leaves during dry season. Only *Schleichera*, *Schoutenia* and *Garcinia* retain leaves. Undergrowth completely deciduous, herbaceous part disappears.

Soil thin and black "Andesitic-basalt" outcrops generally. Old flow.

The more wooded part is in a valley

Dec. 23 Pangajene - to Baluran

At Asambagur photos of ox cart, horse cart, stone, etc.

West of here a large flat area has been cleared and plowed for large scale cotton planting. Scattered *Azadirachta* trees left, forming a sort of savanna landscape.

From Soembereijen a dry sloping savanna, very rocky, said to be severely burned every August. Certainly looks that way. This is lower slope of Baloran volcano. Commonest tree *Schleichera olerosa*. Teak plantation below road. Above road where it circles mountain is a more closed, tangled open forest. Shallow dark brown to blackish soil.

Teak plantations almost all young, some very young. Interplanted with *Leucaena*, occasionally *Acacia arabica*.

This all on foot slopes of volcano, very gentle slope, very rocky.

Tamarindus planted along road.

From end of surfaced road

the vegetation is mostly more or less natural, except for occasional small plantings of *Leucaena*.

This *Leucaena* is coppiced and grows up to clumps of thin wanders, as thick as a thumb and 3-4 m. tall. few leaves, clumps of fruits.

The vegetation varies from a tangled thicket, choked with lantana and vines, trees mostly with crowns not touching through open forest with a dense scrub layer of lantana camara, to savanna with grass and scattered trees and clumps of thicket.

The grass is dry, barely starting to send up tiny shoots, more advanced where it has been burned.

On flat ground are areas of grass on conspicuously cracked, polygon ground, black soil.

The forest is partly thorny, and partly deciduous, partly microphyllous.

Talpat, Balocera -

Dissected lower slopes of the volcano, drastically burned over, with sparse tufts of several kinds of grasses, a few scattered small trees of various kinds -

Phyllanthus emblica, Morinda sp., acacia leucophloea, Grewia,

ayodianta

casia
pictata
ayodianta

etc. a few small herbs - Buchnera, Vernonia 2 spp. Euphorbia, etc.

Gallery forest in ravines - rather dense - Spondias, Premna, Ficus, Morinda, Grewia, Pisonia ^{indica}, Phyllanthus emblica, Schleichera, etc. A tiny trickle of water in canyon.

Spondias ~~fruits~~ stone, scattered over dry hillside, well above Spondias trees. Bats said to be present.

(Photos of mountain side & deep canyon)

The flat grassy areas with cracked soil have scarcely any trees.

They are surrounded by areas of savanna and of open deciduous ^{semi-deciduous} forest. (photos, ending Rd. 101 3.)

his around look out near waterhole.

look out on small acacia cone

On flatter ground below Talpat scattered trees of acacia, flat topped and spreading. Ground in low spots deeply cracked. Leucaena planted along road for some distance on both sides. (to 101)

Dec. 24 - Pasirputih
degraded forest on steep
slope of basaltic rock
with thin soil

- 29741 *Schleichera*
very common tree in open forest
- 2 42 *Randia*?
in open
- 5 43
rare in undergrowth
- 5 44 *Cratogeomys*? *Canis*?
common in undergrowth
- 3 45 *Callicarpa*
rare in undergrowth
- 1 46 *Tabernaemontana*
rare in undergrowth
- 3 47 *Wedelia*
occasional in open
- 7 48 *Randia*
occasional in undergrowth
- 1 49 *Thunbergia alata*
rare in open

Dec. 24 - Bekol

- 3 50 *Schoutenia ovata*
common in open forest

Dec. 24 - Talpat, north
base of Malosoran Volcano
gallery forest in ravine

- 4 51 *Premna*
occasional

small tree,

- scandent shrub;
flower greenish.
- small shrub; flowers
white; fruit immature.
- scandent shrub or
liane; flowers white.
- depressed shrub; flowers
pinkish purple.
- small shrub; flower
white.
- depressed herb; rays yellow.
- shrub 1.5 m. tall,
flowers white.
- flowers white.

shrub

small tree, aromatic;
fruit immature.

- 39752 *Spondias mombin*
one tree in gallery forest
in ravine
- 2 53 *Morinda*
very common
- 3 54 *Vitex*
occasional
- 3 55 *Zizyphus*
common
- 1 56 *Disoclea*
common, twining in shrubs
- 1 57 *Vernonia*
common in open grassland
- 1 58 *Euphorbia*
rare in open burned grassland
- 1 59 *Buchnera*
rare in open burned grassland
- 2 60 *Morinda*
common
- 1 61 *Grewia*
occasional

Dec. 25 - Woods, north of base
of Baloran Volcano
Dry thickets in savanna

- 3 62 *Morinda*
common
- 2 63 *Abutilon indicum* (L.) Sweet det.
common under trees in Fryxell
- 3 64 *Grewia*
common ~~is~~ on small hill
- 1 65 *Cissus*
with andersonii

tree about 10 m. tall;
fruit

small tree; fruit
green.

small tree

small tree

leafless

sprouts from base of
old sticks; flowers purple.
glands white.

flowers whitish.

small tree; flowers
white

small tree or shrub,
2.5 m. tall, flowers
yellow, fruit immature.

spreading tree 3 m. tall; fruit
immature, said to be eaten when ripe.
suffrutescent herb or slender
shrub 1.5 m. tall; flowers
orange. ~~sp. det.~~
small tree

sterile.

Dec. 25 Coast north of Banjaruangi

39768 *Casuarina*

occasional in dry thickets, occasional in dry thickets, erect shrub, prostrate, sub-erect, flowers pale lavender, common on wetter along shore.

69

Cracks in ^{black} soil up to several cm. wide and at least 1 m. deep.In ravines and low spots a tangled gallery forest. (Photos 6-10 but 5-8 on roll 4, not *Cassia fistula*)On slopes & mixed savanna with *Acacia leucophloea*, *Phyllanthus emblica*, *Cassia fistula*, *Bambusa* sp., *Hydnocarpus andersonii* etc. (half dozen photos 8, 9, 10, 11)

(Photos of cracked ground and grassland on it)

Around trees small clump of trees in savanna tend to be concentration of shrubs, mostly scandent and semi-scandent (photos)

Photos from lookout. Behol.

The shrubs run together to form a tangled layer about 2 m. high where the trees are close enough to form an open forest. This in most places is largely *Rantania camara*, which is deciduous here.

with Kain

Dec. 25 Wongsorejo

39766

Acorus calamus L. small clump along stream

67

Thunbergia alata common around buildingsWongsorejo - Banjaruangi
great trees along road of
Salmaria melabaria (Baba,
m. 1), *Lomaria*, etc.*Tamarindus* has disappeared.Wongsorejo - Coiba very
abundant. Bananas
produced for export.Dry hills approach shore
at narrowest part of
Bali Strait. Covered by
low tangled scrub forest.Beyond here *Tamarindus*
reappears. Coconut plantations
with or without understory
of bananas very extensive
on coastal flats here.Maize also planted
under coconuts. Coconuts
here healthy looking,
backs near Wongsorejo
were very yellow - said
to be attacked by a pest.Trees start bearing at
6 years, considered too old
at 30 years.Manihot also planted
under trees. Laborers who
care for trees and make copra
plant the crops between the
trees as their compensation.erect, with aromatic soapy odor.
twining, flowers pale lavender.

Dec. 25 - Jilimanuk (road of the birds) drab looking port, landed on beach down a plank from ferry. *Azadirachta*, *Hibiscus tiliaceus*, *Lanea grandis* (more or less bare)

Along road for 2-3 km. is a striking open forest of *Brassia*.

Then dense thicket or tangled scrub forest, especially on the right. On left some mangroves. Raining very hard.

The *Brassia* has grass beneath, no shrubs. Said to be burned twice a year. Spacing between savanna and open forest.

Photos (now 28-30) of typical tangled and growth landscape of North Bali. Saw several white storks. This is game reserve.

Gunung Sangyang (god's mt.) is a spectacular dissected volcano.

The country after the game reserve is densely cultivated, mostly in maize or kapok & maize.

Pula Pulahi - temple - spectacular, tall cliffs. Many gray monkeys. (photos). (photos of *Brassia*) *Brassia* very abundant in this vicinity near shore. *Acacia leucophloea*. Large flat topped trees.

Lower slopes degraded to ~~savanna~~^{open forest}, very much resembling the lower ridges on S.E. Oahu. The higher mts. also resemble the Koolau from a distance.

A large area of Coconuts with an understory of bananas, very luxuriant. Large flat area of rice, very luxuriant also.

Then more coconuts + bananas, with some areas of Maize. Rice and vegetable mosaic app. *Linardja*.

Dec. 26 - Bedugul, Lake Bratan.

Drymaria here has helical filices, not visited. reports either pilose or glabrous, or even inf.

4700'

Across lake a long ridge with plantation on one side, the steep side above lake still in fairly good montane forest - abundant epiphytes, main genera *Litsea*, *Mitchelia*, *Eugenia*, *Schefflera*, *Moracanga*.

Dec. 26 Bedugul, on Lake
Cratan

39770 *Drymonia*

on cut banks of volcanic soil
near building

71 *Ervillea sonchifolia* (L.) DC.
on masonry wall just
above lake

72 *Ficus aurantiaca* var. *parvifolia* (Sw.)
common in montane rain forest on ridge

4200'

22

det. Corner

Common

4700'

↓

1442'

73 *Adinandra*

common in montane forest

74 *Lambucis*

very common in open places
along trail

75

75 *Michelia* () glauca

occasional in wet forest on ridge

76 ~~Adiantum~~ *Astronia*

occasional in wet forest on ridge

77 *Rubus*

common along trail in wet forest
on ridge

weakly erect.

flowers purplish pink

woody climber reaching
high in trees, fruit
depressed globose, deep
orange spotted with white,
turning soft and deep maroon
on becoming fully ripe.
Lower parts, even when
fruiting, appressed to tree,
parts high in tree with
larger leaves and spreading
branches, also fruiting (not collected).

tree; flowers whitish.

shrub 2 m. tall (reaching 3 m.)
flowers white (no yellow
glands in inflorescence), in
flat to roundish topped
cymes. Old inflorescence
purple setting very few fruits,
then immature.

tree. leaves glaucous
beneath.

tree; inflorescence and
flowers pink.

scandent shrub.

flowers white.

1458 *Bala* *Podocarpus* *Cavendishii*
Indrella, many *Urticaceae*, *Lepotes*
 with epiphytic *Ficus*,
 many ferns, orchids,
 mosses, *Polypodiaceae*.
Rubus moluccensis in
 undergrowth with very
 conspicuous lacinate bracts
 in young inflorescence.

One *Lepotes* with long
 pendent blue inflorescences
 and very fleshy translucent
 fruits.

Peaters not seen but possibly
 present.

Most of these slopes, even
 the highest, except those almost
 vertical are covered by coffee
 plantation with overstory of
Erythrina sp. Some native
 plants in ravines. Mostly
C. robusta, said to be some
C. arabica.

Sungaradja to Penulisan Pass. 5700'

Climbed through complex of
 coconuts, fruit trees, rice terraces
 to over 2500'. replaced by ~~coffee~~
 coffee plantation with *Erythrina*.

At about 4000' they start to be
 small farms. At perhaps
 5000' there are remnants
 of native forest, plus
 plantations of *Cassia*,
Euphorbia, *Macaranga*,
Waddingtonia. This area

seems moderately wet.

Hotel (Dentamandi)

Along *Agung* and *Batur*
 and caldera lake - *Batur*

Photos of *Kehen* temple.
Dangli

Photos of *Agung* volcano
 and river from *Peak of Bala*
 below *Dangli*.

Photos of *Elephant* Cave (b.w.)
 bathing place, archeological material

Bali pigs are a strange
 breed, elongate, with a
 deep sag in the back
 and a pot belly; black
 and pink in color.

Bali cattle look much
 like the wild *banteng*,
 females red, males
 dark, blackish. all with
 the conspicuous white
 patch on the backs of the
 legs, only the variability
 in the horns suggesting
 any hybrid ancestry. Some have
banteng horns, others slightly suggest
zebu.

Fodong - old name
Dec. 26 -

Badung

39716 *Carica*

in dense primary forest

2 79 *Carica*

in dense primary forest

same
April

Dec. 26 Hotel Kintamani
dooryard

1 80 *Drymonia villosa*

occasional, with *D. undata*

1 81 *Hydnora cordata* (L.) Willd.
common

Dec. 27 Sacred Forest of Bangels

dense tall forest of Dipterocarp

1 82 *Pisonia silvestris*

second story tree in

2 83 *Baccaurea*?

in undergrowth

84 *Dipterocarpus hasseltii*

dominant tree in

3 85 (Plut.)

common in undergrowth in

4 86 *Psychotria rubra*?

rare in undergrowth in

brought in by native collector

low branching thick
stemmed rosette tree;
flowers whitish. ♀.
same ♂ & ♀.

leaves plane, fruits immature
pulp slightly hollow
cavity around seeds.

pedicels very viscid.

tree 20 m. tall, fruit
very sticky.
shrub 1 m. tall.

material picked up from
ground under trees 40 m. tall,
flowers pink.

shrub 1 m. tall, aromatic
when broken; flowers white
fruit gray-green.

small shrub, fruit red, fleshy.
flowers greenish-white.

Dec 27 - Sibang

Photos of market and village temple (at 10 - on road, 400).

Sungeh - Sacred forest of *Piptocarpaceae hasseltii* & *Pisonia silvestris* (photo. 400, 400). Trees more or less uniformly about 40 m. but dbh varies from 25 cm. to 100 cm. trunks smooth for 30 m. scattered second layer 12-20 m. *Pisonia* & saplings. second ~~growth~~ layer 1-2 m. more varied comp.

Epiphytes in canopy.

Gray monkeys around temples.

(see Womersley forest around burial grounds in N. 9.)

Village complex - coconuts, Arenga, ~~arenga~~ jack, breadfruit, mango, citrus, Musa, bamboo, Hibiscus, tiliaceae, Salakia, Ceiba, Carica, Manihot, Eugenia, curatella, Blumea.

Gulingan temple - ~~the~~ had photos rice edifice temple.

End of road in Uluwangi village - mud walls, etc. Sadeh temple (road 8-10 beginning of road 1.)

Coconuts and Arenga attacked by insects. Arenga not. Coconuts more damaged than Arenga.

The palms commonly seen are *Cocos nucifera*, *Arenga pinnata*, *Arenga cathecu*, less commonly, *Salakia edulis*, ~~edulis~~ commonly a slender very tall fan palm.

Houses generally walled with mud or masonry walls. Tops of mud walls protected by thatching. Mud walls made of large blocks cut from earth.

Cows kept in special small bamboo shelters. Cows washed twice a day. Pigs abundant, one of most important exports, second only to coffee. Pigs exported alive in cylindrical bamboo cages. Sent as far as Hongkong and Singapore.

Between Denpasar and Lamsu *Pisonia grandis* var. *alba* is common. Not seen elsewhere in Bali.

- 39787 *Psychotria*
common in undergrowth in
- 88 *Parrotia*
common in undergrowth in
- 89 *Melastoma*
occasional around edges of
- 90 *Hedyotis biflora* (L.)
on steps of temple
- 91 *Hipterocarpus* ~~fruticosus~~ ^{hirsutus}
common in undergrowth
as seedlings.

Dec. 27 - ~~Sadeh~~ ^{Sadeh} Temple

- 92 *Mollugo*
occasional
in front yard of temple
- 93 *Dantella serpyllifolia*
abundant

with
Kosterianus

- Dec. 27 *Sanus*
- 94 *Ximenesia americana* L.
in beach vegetation

Dec 28. Denpasar to Gilimanuk.
Generally the area near
Gilimanuk is scarcely
like Bali. Scattered houses,
few villages, no rice, almost
no temples, some second
growth, few rows of
Euphorbia nervifolia, maize

shrub; flowers white;
fruit orange when ripe.
shrub 1 m. tall; flowers
white; fruit immature.
shrub 1 m. tall; flowers
deep rose purple.
buds white.

These seedlings, with
hairy stipules, mixed
with and intergrading
with those with glabrous
stipules.

stems spreading

forming very flat mat;
flowers dull white.

fruit yellow, sour, with
pou flavor, but flesh
unusually thick.

the most important crop.
Small development of
mangrove (seen nowhere
else on island), conspicuous
groves of *Brassia* (photos).
Black sand beach at Gilimanuk
part magnetite, part hematite?
or argite? (sample).

The flat land of Bali, the coastal plain, except for the part around Gilimanuk is very intensively cultivated, mostly in rice where water is available for irrigation. In places even the dikes in the rice fields have a row of beans planted on them, or Sesbania.

Bali varies from ^{one} local region to another in the pattern of cultivation, etc.

Imperata cylindrica occurs generally, but is also planted, especially on steep slopes, for use as thatch. Said to last 8-10 years, while coconut leaves last one year. Arenga sheath fiber, used mostly on temple roofs, said to last 30-40 years.

Dec. 28 - Banjuwangi - Djember
From Banjuwangi south
largely coconuts, then
rice. This continues - flat
rice fields with islands
of village complex, more or
less the same to Genteng.

West of Genteng coffee
begins to appear, shaded by
Ficus, etc. at about 700-800'.
Rubber starts somewhat
west of this. Still large
coconut plantations.

Coffee soon dominant, and
continues so till we climb
a mountain mass. Here ~~degraded~~
degraded forest with climbing
fambro (a very wide-leaved
sp.) appears at about 1800' and
coffee disappears at about 2200-
2300', replaced by the degraded
very dense forest. Under
layer a terrific tangle,
~~to~~ 5-10 m. tall. Scattered
large trees remain from
original forest. On the
other side of this ~~hill~~
hill coffee does not
reappear, but there is a
little teak, suggesting
that the hill is limestone.

Then ~~the~~ rolling to some-
what dissected country
with rice. Imperata

bananas,
trees, etc. villages.
18 km. S. of Djember
an area of old karst
topography, much
worn down.

^{terrible rain}
Djember - Probolinggo
Tobacco - rice - sugar - rubber
coffee areas. Or. teak on low hills
remendous dissected
volcano - Rungto to right.
North of Lumadong a great
irrigation canal between
dikes, level of water well
above that of rice fields,
giving the appearance of
floods. Very green.

Xanthosoma sagittata
much the commonest terato-
rial aroid in Java.

Evidence of a serious flood
just south of Djember
Follow canal toward
Semeru Volcano, ^{3770m} highest
pt. in Java. Lamongan
V. on right. Said to be
lakes or maers in small
~~one~~ vents on side of Lamongan.

Much sugar and rice
in former marsh or old
lake bed, now fields on side
of great canal.

A few km. S. of Probolinggo
rather high ground with

mostly maize, little or
no rice. Dark reddish brown
soil. Great volcanic
boulders in stream beds.
Scattered clumps and
rows of bamboo.

Rice again at Ketjes.
Streams in this entire
region very muddy.
There has just been a
very hard rain.

Vast rice fields.

Probolinggo - Madium
West of Probolinggo a few
km. a low coast with clumps
of a very low Pandanus
in otherwise bare mud flats.
Intricate network of
fish traps in shallow
muddy water.

Dec 24 Madium to Puncokerto
Madium River very high,
very muddy.

N. e. of ~~Madium~~ a large area of
rolling hills with teak forest
plantation in various stages -
some fallow land.

Teak leaves harvested and
taken to market for use as
wrappers.

Ipomoea carnea very
common along roads and in
fence rows.

About here the large
Terminalia trees disappear
from roadsides.

Photos (hol.) of rice planting
~~and~~ ~~first~~ of ~~Lusitana~~ (photo).
Dragon

Photos of rice harvest
24 km. ew. of Solo.

Tobacco and sugar in
this region, as well as rice.
Large tobacco barns. ~~Many~~
peanuts seen around Klaten.

Photo of edge of village of
~~P. Gondang~~ Gondang.

Temple at Brambanan -
photos - being restored, work
going on since 40 years. Huge
Terminalia catappa trees
in courtyard. Ruins said
to date from 9th century
Hindu culture. Statues of
Vishnu, Shiva, etc.

Another smaller temple
not restored, at Kalantana.

Leucaena ~~sp.~~ ~~sp.~~
Leucaena ~~sp.~~ ~~sp.~~ Very shaggy.
Trunks yellow, forked.

Barabara. Munos aspen
along edges of rice fields.
Limestone range to south
almost completely deforested.

grassy, and in places
badly eroded. Lower slope
with some secondary forest.

Borobudur Stupa - solid
dates from 773 AD - restored,
but original stoves and
images used. 504 images
of Buddha, a missing taken to Lian
by Chulalongkorn. (Many photos)

Rejimen region - most
densely populated area in Java
1400 per sq. km. Village complex
appears to occupy more ground
than rice fields. Some rice
fields have gardens
raised a few inches above
water level.

Just west of here a low
range of grassy hills -
Imphata.

On a few miles to right
is a low mountain, almost
completely deforested, except
for a few tufts of trees on
several hilltops. Some
Hevea plantation. Lower
slopes in coconut, mostly.

Dec 30 Purwokerto to Bogor.
South of Purwokerto limestone
hills with teak plantation.
Grazing permitted in teak
plantations, and erosion

is not prevented. Rivers
exceedingly muddy.
Towards south and west
are rice plus village
complex.

in village complex (E of Wangan)

near

Bambos

fibreses teleseus

Bola

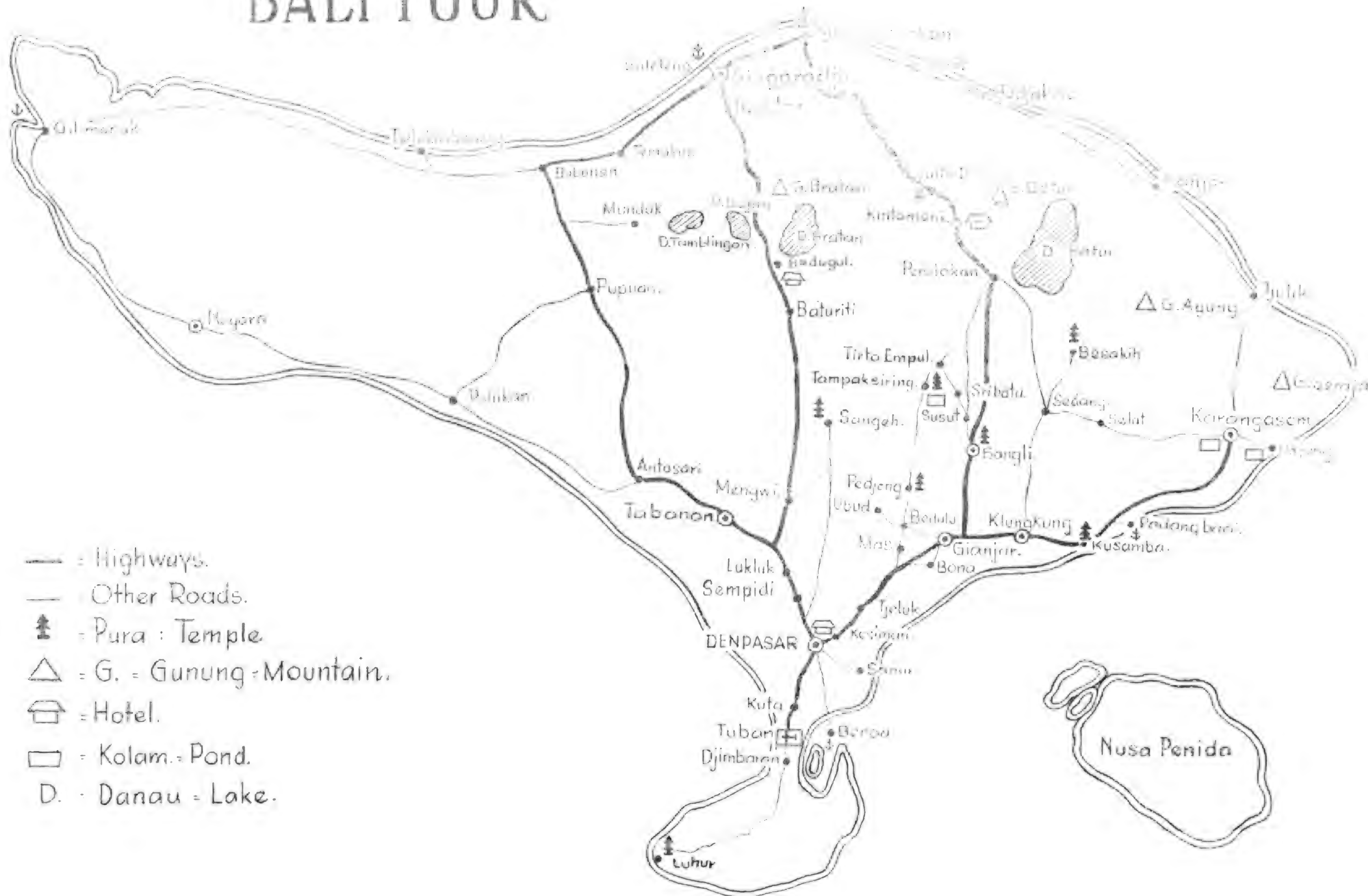
insinuator

Cerophyllus

to be

ngon
of

BALI TOUR



- = Highways.
- = Other Roads.
- ☸ = Pura : Temple.
- △ = G. = Gunung = Mountain.
- ☐ = Hotel.
- ☐ = Kolam = Pond.
- D. = Danau = Lake.

TOURS

- S S A From Bali-Hotel to Lukluk (temple), Baturiti and Bedugul (p.m. 12.00 above sea level) on lake Bratan, opportunity for swimming. Back to Bali-Hotel. Duration 1 hours.
- S S B From Bali-Hotel to Sangeh (Holy Forest temple and monkeys) then to Mengwi (temple) and back to Bali-Hotel. Duration 3 hours.
- S S C From Bali-Hotel to Bona to see Ketchak (Monkey dance). Tickets obtainable at Bali Tour. Duration 3 hours.
- S S D From Bali-Hotel by way of Kedewetan and Ubud (centre of painting) to Bedulu (Elephant's Cave). Then to Tampaksiring. Excursion to Gunung Kawi on foot to see the old monastery and King Tombs. Then to the Holy Spring near Tirta Empul and from there back to Bali Hotel by way of Mas (wood carving) and Tjeluk (silverwork). Duration 5 hours.
- S S E From Bali-Hotel to Tjeluk (silverworks) Gianjar, Bangli (Pura Kehen) Penelokan (beautiful view on Lake Batur) and the volcano of Batur) and Kintamani (1500 m above sea level). After lunch at Kintamani Hotel back to Bali-Hotel. Duration 7 hours.
- S S F From Bali-Hotel to Tjeluk (silverworks), Mas (wood carvings), Bedulu (Elephant's Cave), Tampaksiring. Excursion to Gunung Kawi (old monastery, King Tomb) on foot. By way of Sebatu, Susut, Bangli (Pura Kehen) Penelokan (beautiful view of Lake Batur and volcano of Batur) to Kintamani (1500 m above sea level.) After picnic lunch at Kintamani Hotel back to Bali-Hotel. Duration 7 hours.
- S S G From Bali-Hotel by way of Tjeluk (silverworks), and Gianjar to Klungkung (Kertagosa, old courtroom). Then by way of Bukit Djambul with beautiful view on the valley of Klungkung and the island of Nusa Penida, to Besakih (Great temple, mother temple of Bali). Then by way of Rendang and Selat to Tirta Gangga (opportunity for swimming) picnic lunch (taken from Bali-Hotel). After lunch to Udjung (water palace of Radja Karangasem and via Kusamba (Goa lawah, Bats Cave). Klungkung back to Bali-Hotel. Duration 9 hours.
- S S H From Bali-Hotel to Sanur (sea bath at Sanur, Swimming and opportunity to visit Mr. Le Mayeur, painter). Duration 3 hours.
- S S J From Bali-Hotel by way of Sempidi and Kapal, Mengwi, the by way Kediri to Tanahlot (temple on a rock in sea) Back to Bali-Hotel. Duration 4 hours.
- S S N From Bali-Hotel to Kuta Beach Djaja, Kuta to visit the painter Agus Djaya. There is a nice beach in opportunity for swimming. Duration 3 hours.

of a very old temple
badly eroded. Tower - low
with some small figures.

Borobudur temple - solid
dates from 778 AD - restored,
but original stones and
images used. 504 images
of Buddha - many taken to Japan
by Chulalongkorn. (Many photos)

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1400 per sq. km. Village complex
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South of Purwokerto limestone
hills with teak plantation.
Grazing permitted in teak
plantations, and erosion.

is not present. Rivers
exceedingly muddy.
Lowlands south and west
are rice plus village
complex.

in village complex (S of Wangan)

rice

umbos

Hibiscus tiliaceus

Mango

in the sa

Ceciba

Avicennia casar. b. l.

Mimosa

Saccharum officinarum

Areca

Annona sp.

Artocarpus heterophyllus

Citrus sp.

breadfruit

Manihot

Ananas

Tea

Psidium

Albizia sp.

Leucaena

Gliricidia

Cassia

Tecoma

Tamarindus

many ornamentals

Canna edulis

A few km. W of Wangan
another low range of

limestone hills, mostly in teak. Not heavily grazed. A few villages and banana-mango culture. Then west of this, the hills continue in better, small cultivated patches, thickets, rice in ravines, village complex. Some degraded forest on highest steep slopes. But some very steep areas bare. Some teak plantations again, westward, limited areas. This hilly country extends westward some 100 km.

Road gradually gets out of it to south, running parallel to it through low rolling hills in teak, much grazed.

Then about 10 km. a large area of village complex and rice. Coconut plantations on lower slopes.

Then extensive flooded area. Then a low range of hills covered by mainhol fields, red soil, then another large flooded area, near Wandegga, then much smaller.

On both sides of Tachmalay is a mosaic of rice fields

and small rounded hill with rice, mostly corn, bamboo, etc dwellings, undergrowth, some other scrub covered area. Picturesque landscape. Gradually, the proportion of rice becomes less, that of hills more, the hills just and then there is a ~~predominantly~~ predominantly upland landscape with some rice here and there.

oward forest the country is mountainous, volcanic, with spectacular rice terraces below, shifting agriculture on higher steep slopes, little forest left but thickets in ravines. Arenga common. Many ~~are~~ trees flowering. Rice not appears to be ~~monoculture~~ monoculture at least has a number of avillany inflorescences at base. Male below. How ~~long~~ this country is is not clear, but ~~some~~ some say indefinitely. Many trees in bad shape, some dead, but no correlation some flowering half way down trunk. The

black sheath fiber
 is said to be used to
 line septic tanks, to wrap
 poles which are in earth,
 etc. as it resists rot
 and termites. Also used
 to make the lat for tying
 roofs - very strong. Fruit
 eaten. Lat used for sugar
 makers. Very little
 used for toddy fermentation.
 Iron prevented by smoking
 bamboo collecting containers.
 Coconuts very rare
 here, 3 per tree, seen at
 3400, several other nearby
 badly attacked by Dryobates.

Volcanoes Mt. Garut and
 Mandung cleared and under
 cultivation to summit.

Phacelia ~~stemon~~ *indica*
 commonly used as hedge.
Albizia *coronata*
 A small bamboo more
 rarely

Jan. 2 - Bogor

planted in gardens

39795

Endiandra laevis

5

76 Pseudanthemum

5

97 Hura crepitans

5

98 Hura

large spreading tree,
flowers white, somewhat
fragrant, leaves slightly
aromatic when crushed.
small shrub, leaves
green with dark purple
veins; corollas white
with purple dots near
center.

spreading tree, male
and female flowers ~~and~~
dark red; the male spike
glandular, with two
whorls of ~~stamens~~ flowers
each.

spreading tree, male
and female flowers
white. male spikes
compressed ~~in the direction~~
~~of the length~~ parallel
with axis. flowers
arranged spirally, many;
edge of ~~lobes~~ stigma
of female flowers deeply
lobed.

Jan. 5, near Tjogrey
bits of proposed addition
to the botanic garden.

Rolling hills with
rather deep dark brown
soil, volcanic ash rim
deep ravines with
water and woods or
thickets of bamboo,
miscellaneous trees.
The top of ground is
terraced, some in rubber
some in grass, common
etc. Said to be former
rubber estate. Perhaps
200 m. alt. or more, 700 acres
on gradual slope above
Bogor.

Some coconut trees.
300 m. S. of a Pansettia
by the river.

Pieces of tall red soil.
Some young rubber
some rice, some banana.

Jan. 9. Darwin - Drizzling
rain, said to have been
raining from Monday till today,
Thursday.

The area around Darwin
is green. Open forest of rather
small trees, mostly eucalyptus.
In town a typical tropical
assortment of ornamentals.

Mussaenda catherinae v. *benderiana*
Calophyllum inophyllum
Polyscias tricholepis
P. guilfoylei
Delonix regia
Pseudanthemum cantharis
Polyscias frutescens var. *ferruginea*
Polyscias pinnata?
Mussaenda frondosa var. *aff.*
Thavetia palmata
Guzmania rubra
Ficus sp.
Antigonon leptopus
Lawsonia inermis
Bougainvillea spectabilis
Catharanthus roseus
Acalypha arnestarea var.
A. hispida
Jatropha podagracea
Nephrolepis sp.
Synonymum sp.
Leindaphne aurea
Euphorbia pulcherrima
Sansevieria rostrata
Marrubium caeruleum var. *caeruleum*

Prevailing vegetation around Darwin is a seasonal open forest, varying toward savanna, of two species of eucalyptus.

Buchanania, Terminalia edulis, Gevelia sp. Cordia spp., with Cyperus medius rather common and Desfontainia humilis rare. The ground cover is tall grass. This is burned every year.

Locally, with no obvious topographic difference, as a type of monsoon forest, densely tangled with vines, difficult to walk through. Stature about 15 m. In dry season the majority of trees and most of undergrowth species lose leaves, but some for only a short time. Burned every year.

Patches in vicinity of Darwin being destroyed for subdivisions, golf courses, etc.

Mangroves common along coast but growing on rock terraces exposed at low tide. Terraces cut in a peculiar rock called chalk locally. A bedded breccia. Perhaps dominated

Platytheca
combilina
very
common
here?

in parts seen, but a white flowered Eumitras common, Pemphis aculeata, Acacia, Sonneratia, Avicennia?, etc. Really swampy places seem mostly, almost pure stands of a shrubby Callicornia. Hippomane manzaniella occurs, doubtless introduced.

Along rocky shore and top of beach thickets of various species, with Leucola sericea, Cordia subcordata, Guettarda speciosa, Capparis sp.?, Grewia sp. Hibiscus tiliaceus, ~~Thespesia~~ Thespesia populnea, Exocarpos latifolius, Alstonia sp.

An beach Thymela per-caprae sp. brasiliensis.

Passiflora foetida with orange fruit common but segments of bracts scarcely interwoven.

Caesalpinia pulcherrima (yellow)
Cassia mucronata
Acalypha mangrovia?
Clitoria ternatea
Plumbago obtusa
Quercus indica
Tamarindus indica
Lamprocarpa
 Mimos. sp.

Labeled
 by [unclear]

Jan. 7 - Darwin, N.T.
 (Myrt.)

39799 among mangroves on rock
 substratum covered by high tide
 31900 *Exocarpus latifolius*
 In thickets just back of beach

- 2 01 *Burkea*
abundant in open forest
and in disturbed places
- 2 02 *Stachytarpheta*?
common in open forest
- 1 03 *Cassia*?
common in open forest

Jan. 9 - Alice Springs, N.T.
 around airport, on flat white ground

- 2 04 *Brickellia*
- 1 05 *Eragrostis*

shrub 2 m. tall, aromatic;
 flowers whitish

yellowish green shrub
 2 m. tall, ripest fruit
 turning dull orange,
 receptacle swollen.
 heads lavender blue

flowers with limb white,
 tube yellow.
 flowers yellow, almost
 or quite actinomorphic.

prostrate leaves pale beneath.
 small tufts, culms
 almost erect.

Jan. 7 - Trip by air from Darwin to Adelaide - Dec. 4, left at 7:00. Rain had been very rough, about 25 times of breakers, water muddy. Considerable mangrove ^{thicket} ~~forest~~ of Darwin is a small bay. also ^{at} 3 small estuary systems ~~south~~ of the air field and a large one south of Darwin filled with mangroves.

7:30

Clouds cleared away from small area along a muddy stream. Low hills trending parallel to stream - wooded, locally densely so. Bare ground along bottom lands, becoming grassy farther south. Traces of old channels, represented by strings of ponds. some bare spots. Then simpler some open country - flat areas in grass, slightly elevated parts savanna to open forest locally. Ponds, ^{usually} ephemeral, very muddy, abundant. The country flattens out more and grass and savanna are more general with gallery forest along streams. Ponds less common. The grassy areas are green but the savanna is thin ^{steppe} savanna, with the

7:37

reddish substratum showing it somewhat.

7:37

Country generally rolling, green, mostly savanna, only the highest areas reddish. Some large ponds look blackish, with dead or leafless trees growing in them. These trees really not leafless but somewhat so.

7:43

Hills more prominent, with open forest, savanna grassy. Some higher hills to left in middle distance then closer, irregularly well wooded, some savanna, quite green, on slopes away from course (west). Then flatter savanna locally reddish locally green, with many meandering streams. Then slightly rougher country, with thin savanna, locally green. Then clouds.

7:46

Same, but more hilly, savanna mostly thinner, some open forest locally. Clouds.

7:57

Rolling green savanna or thin open forest.

7:58

A band of low strike ridges trending back and left from course, quite wide, shallow dip, thin wood and almost no grass.

- 8:00 On hills with ^{some} ~~some~~
rocks showing locally.
Rolls a dull red brown
clay.
- 8:02 Approaching Katherine, mostly
cloudy. Thin open forest, some
bright red cultivated fields.
Thin savanna around
Katherine are strip. Some
areas quite green. Area of
very rocky plateau,
apparently over-grazed and
wind eroded, with thin
savanna. Shrubby vegetation
denser in ravines and in
the network of joint cracks
lower areas. With open
forest and grassy patches, ~~you~~
varying to savanna. Gallery
forest along river. Soil very
red where disturbed. Numerous
exhemera (?) pools. Rocky ground.
Conical termite mounds prominent
and abundant locally. Ephedra &
a few Dodonaea along an
strip at Katherine - open forest
of acacias etc.
- 8:43 Left Katherine Extensive open ~~open~~
thin grass ground covers some
rocky spots.
- 8:46 Grass under trees thinner, soil
red. clouds.
- 7:50 Thin savanna. Clouds,
- 8:57 Then forest to savanna, almost no

- ground cover. Country almost flat. Clouds.
- 7:04 Same but even sparser and drier; shallow ravines meandering through slightly rolling land. Clouds.
- 9:11 Thinner forest, mostly savanna, or desert savanna. Soil red.
- 9:22 Apparently desert grassland or thin shrub desert with patches of dense dark green scrub or forest. View not adequate. Clouds.
- 9:24 Patchwork of sandy desert, savanna and forest. Clouds.
- 9:31 Forest becoming more predominant but visibility poor.
- 9:35 What appear to be several large dry lakes, surrounded by an uneven stretch of open steppe-forest. Patches of thin grass or shrub savanna.
- 9:38 Another large dry lake, very sparse shrubby vegetation. Curious very pale dendritic drainage pattern leading to another dry lake farther to left. Lake gray and area ~~is~~ immediately adjacent is bright red. Road across lake is white. Red part is

apparently debris from a slope very low. Several round pits with water around edges of lake. Far side of lake has a sandy strip.

9:39

Evidently the red sand from this side scarcely blows out onto the lake bed, but there are very small dunes a mile or more sand on the lake bed. Then a considerable strip of small ripple-like dunes. Lake becomes more vegetated, now predominantly lakes, still very sharply contrasted from the red area, both of these with somewhat of a patchwork of vegetation, a very curious pattern, possibly due to man, but very difficult to explain. Then some rolling lighter red land with abundant pools of muddy water.

Then an irregular patch of red and pale gray areas, some with open vegetation, others with almost nothing. Clouds.

10:07

A red desert with irregular small patches of denser vegetation. Apparently approaching ~~Alien~~ Tennant Creek.

10:09

Vegetation becoming somewhat

denser, savanna-like but still desert. Scattered small yellow-green trees.

10:10

Some very thin desert grass, substratum a lighter red. Slightly more of a sylvan dense spruce is approached.

10:14

Very rounded stony ridges at about 70° left of course. More vegetation in depression between them. ~~the~~ shallow dendritic gully system with more vegetation.

10:18

Some small flat topped erosion remnants. Then somewhat ~~higher~~ vegetation, but irregular. A dark scrub, locally.

10:20

Then locally shrub-savanna. Bunch patches of dwarf scrub.

10:20

Erosion remnants darker brownish red. Gallery scrub along dendritic gully system. Mosaic of ~~some~~ steppe-savanna and desert or desert grassland. ~~Tennant Creek~~ ~~the~~ ~~the~~ a small settlement of a few dozen houses. Dark scrub and many red erosion remnants north of air strip. erect cylindrical termitaria abundant in green open scrub and shrub savanna around fields.

10:22

Melis agdestach s. m. m. m.

Pigeon
Pigeon
Pigeon
Pigeon
Pigeon

Tennantia aphylla, and
 T. aculeata, planted
 here, and the same yellow aculeata
 was that we had at Turlack.
 On the flat-topped red
 erosion remnants are a
 few scrappy ~~tree~~ small
 trees, ~~possibly~~ Eucalypta,
 and on slopes a gray low
 open scrub, probably utrifera.

10:57

Left Tennant Sp.

Savanna with Tridens?
 clumps - circular, dead in center.
 Row gray-green areas?

11:00

Then mosaic of patches of
 savanna with desert, very red.
 Then rather even desert
 with vegetation in a
 somewhat rippled
 pattern, possibly small
 fixed dunes with bare red soil
 between them. Patches of even
 thin desert grassland interspersed
 with rippled pattern. Entire
 area red.

11:05

Slightly more of sp. *Ravina*
 with vegetation.

11:09

Mosaic of red and slightly
 green areas, gallery scrub
 in ravines, areas of "rippled"
 scrub desert. Patches of green
 along bottom land of main
 stream paralleling course.
 Some very bright red areas

also some lighter old rose
 pink areas with small
 patches of paler sand, some
 dull greenish red areas.
 Some of the boundaries
 here are regular enough
 to have been fences - possibly
 this pattern may be
 in part due to degrees of
 overgrazing.

11:15

Very low broad strike ridge
 transverse of course, with
 ravines more or less perpen-
 dicularly dissecting them, but
 very shallow, with scrub
 in bottoms, little vegetation
 on higher parts.

11:17

Low rolling terrain - reddish,
 desert savanna, patches
 of dark open scrub, then
 mosaic of ^{small} patches of dark
 scrub and ^{large} ^{open} grass. Scrub
 apparently collects sand. All reddish.

11:21

Patches of scrub scarcer,
 mostly thin desert grassland.
 Elongate somewhat meandering
 depression more vegetated
 than surrounding grassland;
 more scrub patches.

11:25

Patches of almost bare red
 sand (or hard soil).

11:30

Following a stream-bed
 with gallery scrub and
 a flood plain of almost bare

light red soil. Rather dense desert grassland on flat areas on both sides; to right of these a range of low hills, probably a strike ridge with very sparse vegetation except in ravines.

- 11:27 Irregular mosaic of areas of desert savanna, desert grassland and almost bare areas, with meandering stream bottom-land with denser grass, still to be seen.

11:30 shrub savanna. still red.

11:32 Large areas of desert grassland with eroded higher spots. denser vegetation in ravines, scattered along larger re and along stream beds.

This has all the appearance of a formerly badly eroded range, abandoned long enough for cattle trails to disappear.

- 11:35 Small low sedimentary plateau on left, thin grass, ravines radiating down sides, with scrub.

11:37 Low eroded mountains with much. Then shallow complicated dissection of sparse desert grassland and eroded bare areas.

Shallow vegetated ravines. Somewhat of enter relief

Shrub desert with patches of desert grass.

White spots on the red that may be prospect holes. Then more or less continuous red shrub desert, locally rather dense.

- 11:43 Large area of flat desert grass with shrubby patches, gradually changing to steppe.

11:52 Areas with slight relief, shrub desert, flat areas, apparently lake bed, steppe. Shrubby areas may be small sand dunes, perhaps sand collected by bushes.

- 11:59 The lake bed is extensive. at other side of it long dune ridge, with concentric bands of shrubs (Xodachrome). Between ridges bands of steppe. Ridges bare and red except for ~~steppe~~ shrubs. Stepped northly gone, have pattern complex (no assurance that these are dunes).

12:01 Scattered dark low mountain masses, covered by open scrub or scrub desert, bare red fans and flats between them with only scattered shrubs, perhaps small trees. Flying at low alt., very rough

1205

Continuous low dark hills
middle distance to left.
red flats closer, with
scattered shrubs or small
trees. Then scattered low
hills.

1208

Badly eroded area, trees in
lines, possibly gullies but
pattern very strange
possibly concentrically
parallel dune ridges
and valleys, - probably is.
pattern very extensive
(isochronous).

1210

1211

Stream system with trees
along streams. Then more
of same pattern (photo. row)

1212

Apparently approaching
Alice Springs. More ~~low~~ hills.

1214

Open gallery forest along
stream. A broad desert
on low hills. High hills or
Mts in distance on both sides.

1216

Alice Springs, a fairly sized
town, red village. with a
sharp, steep, very straight
ridge just beyond it.
then another, standing
muddy water between
small flat-topped
trees abundant. A very
muddy reservoir.
Then very flat desert, a plain
with scattered trees and
shrubs. A wet divide.

A good airport. Tamarix spp.
with specially twisted distichous
spikes, Melia azadirach, Nerium
sp. Patunia. Catharanthus
roseus, palanchoe sp. Citrus sp.
Cynodon dactylon.

Hot here but a dry breeze
blowing.

1223

Alice Springs
Some green areas, meandering
strips with grass and
trees low open forest, in the
plain south of Alice Springs.
Airport. also ~~meandering~~ with
~~the~~ narrow strips of open
forest. Mostly arboreal
desert and desert grassland.

1227

1228

A few patches of steppe savanna.

A low range of dark brown
hills transverse to course.

1230

Then a mosaic of patches
of desert, steppe savanna, rather
brown hills with scattered
shrubs or trees, red sand
dunes.

1231

Low hills with bluish grass
or Atriplex and scattered trees,
patches of red desert hills.

1232

Town of Boulton, a small
village with patches of red sand dunes (1)
and flats between hills.
A series of hills and
transverse course with
gaps in them. Much desert

vegetation, mostly plain,
with scattered nodular
undergrowth. There was
a narrow vegetationless plain
along the road, some
nodular, some plain
thicket, little sign of
vegetation.

Some beautiful white
ridges and some
of low hills, rather
harsh shaped, some in
valleys, left.

More nodular than most
valleys, than others, though
all dried.

Low hills and small
valleys of forest in some small
valleys.

Black ridges form a very
interesting pattern, not at all
understandable as ridges
seem to intersect. Some are
low hills or low ridges.

Some hills cultivated fields
or then was land, a few
patches of forest and savanna.

Some dry farming of flat
areas, some steps and steps
savanna or low hill.

But a couple of patches of
dense obviously planted forest
open some bottom.

Low in low patches and patches

mostly under cultivation,
except a strip of patches
varying from ^{thick} savanna to
open forest along left of corner,
slightly hilly ground.
The fields green some brown,
some yellow brown.

Some town. More savanna
and open forest, even some
closed forest on low hills.
Patches of forest in distance
flatland patches of
steps savanna and
apparently steps or dry
pastures closed by otherwise
dry farming.

Range of very low hills
roughly parabolic some
mainly steps and
steps savanna. Flat
ground all farmed.

Some low hills have small
woodlots, a patches of open
forest, otherwise all cultivated.
Very flat country.

Another town or middle distance
to left. The very woodlots seem
to be the rule here. Various signs
but all small, various densities
but mostly open forest.

At distance to left a hilly,
partly wooded region
a town below, agriculture

917. *Acacia*, *Gliricidia*.
 Trees along ravine and
 watercourse.
 Bushy, open - some on
 left. What appear to be
 mangrove swamps and
 barrier islands in distance.
 918. Hills land mostly savanna,
 some good forest on higher
 parts, some patches of scrub
 on slopes.

Jaino Adelaide

National Park

Open forest of *Eucalyptus*
camaldulensis, *E. odorata*
 understory of *Acacia* spp.
Casuarina sp. etc. (photos,
 also of *Acacia* + *Leptospermum*
 in enclosure).

On slopes *E. leucoxylon*
 (photos) with *Hydnorium*
 (photo) (result of fire).

From summit of Mt. Lefty
 (1000') forest of string bark
T. obliqua, sclerophyll
 scrub, changing toward
 Adelaide to savanna.

In forest also some *E. baxteri*
 and a few *Banksia ornata*.
Acacia spp. up to 10m.

Mangrove. *Leptospermum*
Gahnia, *Pisonia*, *Sprengelia*
 etc. in bottom of drain. (photos)

Not
 photos
 of
 hills

Acacia? *Cartilago*?
 common in open
 fields.

surrounded by meaty places
 or open forest (photos) rather
 open, 10-15 m. with
 sclerophyllous shrub
 layer almost continuous.
 Scattered *Acacia* spp., several
 genera of leguminous shrubs,
Styphelia, etc.

Leptospermum (photo)
Protea spp. occasional.

Leptospermum dominant in
 shrub layer. *Hakea* common.

Sclerophyllous scrub
 with scattered *Eucalyptus*
 above, *E. leucoxylon* in f.g.
 (photos).

Lower slopes, savanna-forest
 of *E. leucoxylon* (photos)
Acacia, etc. mostly exotic,
 on ground.

The color of these forests is
 uniformly a dull dark green.
 Only the *Acacia* in the under-
 story is bright green. The
 shrub layer, otherwise, is
 also dull dark green. The
 grass layer in the savanna
 and open forest, and on grassy
 flats is straw yellow. This
 is a Mediterranean type of
 landscape and reflects a
 Mediterranean climate - about
 4 rainy months in winter, the
 rest of the year dry. Wine producing
 region.

Jan. 12 - Trip by air to Melbourne. 2:00 pm. at side
 very low coastline, mostly
 sand beach, a few very low
 cliffs to s.e. of city.

Low hills & peninsulas east
 of city covered with savanna,
 replaced northward by open
 forest as higher slopes
 are reached. Small reservoir
 s.e. of city. Some slopes scrub-
 covered. Pattern of distribution
 of forests and open land
 suggests clearing by
 man, at least in many
 cases.

3:06 Rolling country, mostly
 cleared, with scattered
 trees. Much of it ~~is~~ apparently
 in pasture, some cultivated.

3:09 Trees essentially absent from
 here on, except a few along
 water-courses and ravines, and
 in a few areas of apparently
 rocky soil where there are
 scattered small trees and
 some open scrub. Hills mostly
 dry-farmed, now brown, or
 where scrub covered, black.

3:11

(Lake Alexandrina)
 Approaching bay - some
 spots of white soil where
 open scrub, or some seem
 to be desiccating pools. Along

3:13 bay shores are considerable
 salt marshes, of strikingly
 black color, with slight
 dark green development of
 mangrove (*Avicennia* only
 acc. Womersley).

3:16 Around head of bay are
 extensive brown flat areas,
 treeless, possibly pasture,
 with numerous desiccating
 pools, white, apparently with
 salt. Back from this black
 scrub ^{forest} and dry farmed
 areas. Interspersed with
 dry farming areas are brown
 pasture, then scrub, and
 dense scrub ^{forest} tracts of very
 considerable extent,
 mostly on somewhat
 hilly or rough ground.
 Perhaps some of this is forest
 rather than scrub, but probably not.
 3:24 Some distance toward coast
 are extensive wooded tracts,
 indeed, by far the larger part
 of the land is in forest. Soil
 in this region generally pale
 gray to almost white.

3:26

Mosaic of dry farming,
 pastures and scrub or forest,
 in fairly large patches
 continues along coast.
 Forested area characterized
 by sub-parallel undulating ridges.

- that may be done, but not necessarily, it is most very well stabilized by vegetation. Large unbroken area.
- 332 In several places the cover has been disturbed and the lanes have become a tree again.
- 334 A lot of forest fragments, with thin scrub, rather than thin scrub and forest.
- 335 Partially cleared land with numerous ~~scattered~~ elongate spots remaining in ~~parallel~~ alignment along corners for some distance. To left of plane must be wooded area.
- 340 In middle distance big farming almost ~~no~~ common. Most curious brown scrub area with lines, somewhat wavy, parallel but numerous and close together, as though combed. Then more black densely wooded hills.
- 343 Solid cultivated land and pasture. 2-3 places scattered trees. Some patches of wood & scrub.
- 341 Then a broad band of irregular forest or scrub, with these bands ~~at~~ run at about 60° to road, forward to left

350

353

hill.

Another band of cultivated land, dry farmed, but this with irregular cross bands of forest and hundreds of ~~spots~~ ^{patches}, some of them white, others gray or greenish. This band very broad.

Much pasture with scattered trees. Open gallery wood along meandering watercourse.

clouds.

424

Large patches of forest, ~~some~~ (pasture), and cultivated ground. Forest on rounded hills, very dense, dull dark green.

Jan. 11 Melbourne - street and park specimens
~~Eucalyptus~~ sp. *Tristania*? ^{fruits of} *Tristania*
Machera pinnifera!
Genista sp.
Helianthus altissimus
Merium sp.
Cestrum (red)
Abelia grandiflora
Jacaranda ovalifolia?
Platanus hybr.
Cytisus scoparius
Betula alba
Ficus pumila
Helianthus annuus: (over)

Jan 10 - Adelaide, S.A.

35806

slopes of Mt Lofty
Sprengelia?
marshy place

07

collected

common in shrub layer in
Eucalyptus obliqua forest

Jan. 11 Melbourne (etc.)

Crataegus sp.

Aspidelaptes sp.

Myapenthes?

Ligustrum vulgare

Quercus robur } both

Quercus sp. } unhealthy looking

Helium molle

Muehlenbeckia sp.

Coprosma baueri:

Abutilon pictum

Washingtonia filifera

Veronica (Hebe) sp.

Choriza ternata:

Bellis perennis

Phoenix canariensis

Fraxinus magellanica

Hydrangea

Platanus minor

Prunus (Japanese red bird.)

Solanum?

Philoxeranthus

Callistophyllum crassifolium?

Fibrous

Galargonium

Empetrum nigrum

small shrub

shrub, 1 m tall, flowers
deep orange in color.

Viburnum opulus?

Cotoneaster pannosa

Canna lily

Callistemon

Argentea sp.

Helenium?

Poa annua

Trifolium repens

Viola tricolor

Althaea rosea

Ulmus sp. (glabra?)

Alternanthera versicolor

Cedrus libani?

Liquidambar styraciflua

various sp.

Populus nigra (Lombardy)

Hibiscus - like tree, stellate lvs, red, no. 100.

Agathis sp.

Eucalyptus sp.

Populus deltoides?

Arancaria columnaris? (various)

Morus alba.

Pinus sp.

Quercus sp.

Salix babylonica

Acacia dealbata?
Acacia parrisia?
Gentiana biloba
Nedera sp.
Fatsia japonica?
Succisa sp.
Grevillea robusta
Alangium? *Actinidia*?
Gaultheria? fl. white, fr. ^{variegated}
Lymphocarpus?
Brachychiton heterophyllum
Leptospermum?
Rhus pinnata
Plumbago auriculata
Chaenactis?
Ficus sp.

Carduus? (*uticoides*?) common
 in open fields and vacant
 lots.

Jan. 11 - Melbourne - Cooma. Canbe
 left Melbourne

Mostly dry to faintly
 green mosaic of harvested
 grain fields and pasture
 land with abundant
 scattered trees. Trees most
 in pastures - typical *Acacia*
 varying locally almost to
 open forest

Reservoir ~~and then~~ surrounded
 by strip of dense forest, then

a slope with green
 grass and open forest, then
 densely wooded rounded
 hills, the forest on
 ridges very fine textured,
 that in ravines coarse
 textured. A few cultivated
 clearings on tops of
 wide ridges and on small
 plateaus. This forest
 quite extensive.

349

End of forest - now complex
 hilly country with
 wooded ravines and
 steep slopes, otherwise
 grassy with scattered
 trees, the grass mostly
 dry, some small valley
 bottoms green.

352

Narrow green flat
 valley bottom with
 kinky meandering stream
 with narrow gallery forest,
 many traces of old beds
 and meanders.

353

A considerable densely wooded
 range a bit to right.

354

Another small valley
 with meandering stream
 and incredible series of
 old meanders for such a
 hilly country. Then extensive
 dry hills with sparsely
 scattered trees.

Eildon Reservoir, a very complex, browned valley, in a mostly rounded range of low mountains. Northern arms of reservoir in savanna covered hilly country. Treacherous westerly Northern tip of reservoir.

3:01 Then rather level to slightly rolling land, savanna, a few harvested grain fields, grass mostly dry.

3:05 Mosaic of dense forest, open forest, savanna, and cultivated land. Some of grass is green.

3:07 Vast densely wooded area, a few small cleared patches, quite mountainous. Dry plain to left of course. Rather rugged mountains to right. A little cleared and farmed or pastured land in a few of the valleys.

The woods on the mountain slopes are slightly open, showing some ground, varying to completely closed in places.

3:11 Same vast ~~area~~ wooded area on right, dry plain but with a few wooded valleys stretching into distance on left, these valleys seem to be extensions of narrow

cleared valleys in mountains to right.

3:14 A high, very rocky massif, with peaks and ridges of bare granite, ravines and joint cracks wooded, also lower slopes. Said to be much snow in winter, and large skiing resort seen on top of one of peaks.

3:15 Large valley system, with much cleared land, mountains between well wooded. Then another lower mountain mass, solidly wooded.

3:17 Very large reservoir far to left (Hume Res.?) Cleared valley on it. Then vast wooded mountain area, with what appears to be one peak and a high plateau above timber-line in distance to right (~~at the mountain~~). Typically mountain meadow as far as can be made out from distance. Several other smaller peaks also slightly bare on tops. Some high ridges apparently have scrub on west side, dense forest of dark brownish color on east or northeast.

- 3:25 A forest fire in distance
in sight.
The dark brownish forest seen
characteristic of high ~~alt.~~
3:27 scales. In highest ridge
this seems to be a rather
open scrub at least on some
sides. Also seem to be
young bare white trees.
Patches of these very
conspicuous, probably from
old fire.
- 3:30 Semi-open mountain and
ridge tops, meadows in small
valleys very notable here.
No roads in all this
mountainous area.
- 3:32 An apparently new road
below, high, semi-open
rounded mountain-tops
in distance to both right
and left.
- 3:34 Passed directly over very
high, very rocky, completely
open mountain top with
snow patches. Road in valley
to right of it.
- 3:36 Then more rocky semi-open
mts. to right. Very high and
with snow patches far
to left. (Mt. Kosciuszko).
- 3:37 Some small green valleys
in dry savanna covered
hills. After Cooma.

- 3:38 Crossed river.
Hills with scrubby brownish
open forest. Very degraded.
Thousands of fallen tree
trunks.
- 3:40 Very old gray plants abundant
in open forest on steep slopes.
- 3:41 Park-like country with open
grass, patches of open forest.
Curious rock outcrops.
Some green patches of
young grass. Mostly
very close-cropped open
pasture, locally patches
of savanna and open
forest.
- 3:43 Crossed main strip. (Cooma)
Some small ponds.
Circled back. This
is apparently typical sheep
country, probably badly grazed.
Some areas of a coarse
bunch grass. Much outcropping rock
landed. Photos of degraded
open forest. Trees are
low, rounded spreading.
Cooma from here along upper
Murrumbidgee R. to Canberra.
Left Cooma. Rock outcrop
abundant, especially
where there are trees.
Quite a few fair-sized
ponds, some full, some dry.
Dugones have holes on opposite

sides.

4.19 Ranges of low hills with open forest, grassy valley between.

4.20 Meandering stream with clear water winding through hills then crossing into valley and joining river. On other side of valley, tonight, an extensive wooded area of low hills.

4.21 Green fields on river flats. Some serious gullying on sides of valley, but stream is not muddy, at least now.

4.22 Hills covered by savanna, look badly overgrazed.

4.23 Hilly country, mosaic of open forest, savanna and overgrazed grass, some nearly closed forest on rougher areas.

4.24 Fairly high wooded mountain parts left, a rocky rugged sparsely wooded range on right, becomes less rugged and more densely wooded as we follow it.

Valley below pasture and savanna. Badly gulched.

4.25 Hills with very degraded forest and savanna.

4.26 Grassy valley with many small artificial ponds then extensive savanna covered

hilly area.

4.27 A fair sized town surrounded by low wooded hills. Canberra.

Jan 12. Canberra - Sydney
Left side of plane

4.28 Left Canberra.

4.29 Stretch of rather tall open forest, other similar patches, otherwise savanna with enormous amounts

of dead timber - possibly from fire, some stretches with all trees dead. Some rather bad erosion. Patches

of open forest are angular, suggesting that the dead trees may be from clearing operations rather than fire.

4.30 Large lake or reservoir with rather muddy water, very thin grass on flats along shore, no trees except where hills or cliffs come down to shore.

Thin flats of grass, with patches of savanna and fresh gullies.

4.31 Hill left, partially wooded, grass very thin brownish green.

4.32 Couple of large ponds.

Thin grass with patches of forest and savanna, some

- of the forest rather dense, perhaps some are planted.
- 511 Middle distance to left considerable forest on low hills.
- 512 Same close by course. Then a large canyon cut through a small forested area - rather a system of deep canyons almost isolating a wooded plateau.
- 513 Another part of this wooded area has a somewhat pattern or plateau - like a large flow, more heavily wooded.
- Follow the main canyon in distance then - course course at point where it is joined by an intricate tributary system. The whole complex area well wooded and presumably difficult of access. It is also quite an excellent view - surrounded by green pastures and fields.
- 517 wooded complex area ends.
- 518 Another long, similar area - in middle distance to left - ~~appears to be~~ course, possibly giving out described above - not quite. It is a large area and evidently great track.

of Sydney. Flats and hills around Sydney very green. This seems to be the coastal town not Sydney. Beautiful crescent shaped beachworth narrow strip of dunes behind them. Hooped coast. but crops not all pointing same way.

High escarpment just back of coast. Behind the plateau, mostly forested, a little open grassland, some of ~~the~~ ^{the} dunes, densely wooded, several reservoirs in canyons. Some parts very thinly wooded, or scrub covered, much bare rock exposed in this.

612 several subdivisions or housing areas on this plateau, back of a very complicated coast and apparently Sydney itself. Directly back of Sydney is more or less open country with winding river or estuary ~~and~~ ^{extending} over Sydney. Much forest close to city and among suburbs. Some swamp forest in estuary.

Jan 14 - Between Koko Crater
and Malapuna Pt.
roadside in ~~low~~ low
Prosopis forest.

39808

Gossypium tomentosum
common locally

09 *Euphorbia heterophylla* L. M. R. L. V. ~~occasional~~

Gossypium tomentosum
still persists for a few
hundred yards along
the road and somewhat
into the forest. It ~~attains~~
attains a height of two
meters, and is definitely
woody. The flowers
open wide in the morning
(about 8 a.m.), have ~~a~~ protuberant
coherent stigmas, somewhat
bent to one side.

The plants are mostly
badly infested by small
mealy bugs tended by
tiny ants, and the most
heavily infested plants
are dying back from
the tips. Also some of the
plants seem to have
some disease which
makes the leaves become

MISSOURI BOTANICAL GARDEN

"SHAW'S GARDEN"

2315 TOWER GROVE AVENUE

ST. LOUIS 10, MISSOURI

PROSPECT 6-5567

February 9, 1959

Dr. F. R. Fosberg
Pacific Vegetation Project
National Research Council
Washington 25, D. C.

Dear Ray:

Thanks very much for the Poinsettia seed.
They are both the angular, coarsely tuberculate
seed of *P. heterophylla*. As you note, the
pedicels do elongate and straighten as the
fruit mature. This gives the capsule a
relatively clear shot for its explosive
dehiscence. I am very glad to get the seeds,
though I'm not sure that I'll try to grow a
Poinsettia garden this summer. I want to spend
at least a month in Mexico, collecting over
in the west, and by the time I return from
Montreal, the summer will be nearly gone.

I have been somewhat side-tracked lately,
but I do intend to write up my poinsettia
data one of these days.

With best regards.

Sincerely,

Bob

Jan. 14 - Between Koko Crater
and Makapuu Pt.
roadside in ~~low~~ low
Prosopis forest.

37808 *Gossypium tomentosum*
common locally

09 *Euphorbia heterophylla* L. Mt. R. L. Wreck
occasional

Gossypium tomentosum
still persists for a few
hundred yards along
the road and somewhat
into the forest. It ~~attains~~
attains a height of two
meters, and is definitely
woody. The flowers
open wide in the morning
(about 8 a.m.) have 4 prominent
coherent stigmas, somewhat
bent to one side.

The plants are mostly
badly infested by small
mealy bugs tended by
tiny ants, and the most
heavily infested plants
are dying back from
the tips. Also some of the
plants seem to have a
mosaic disease which
makes the leaves become

shrubs up to 2 m. tall;
flowers light yellow, open;
stigmas almost white.
Lactiferous herb, stems
thick, no red spot at
base of involucral leaves,
scarcely nodes. (note for Dr. S. S. B.)

venulose and change
shape, becoming more
deeply lobed and drawn
down at base. Seeds
collected for genetic
studies.

Leaves of *Cordia* cut
with almost complete petioles
and kept in water in a
"pin frog" for some weeks
had developed roots and
were in a completely healthy
condition. Roots radiated from
cut end of petiole.

Jan. 20. Flight San Francisco
to Chicago. Left side of plane.

East of hills back of
Oakland is a very considerable
area that is not cut up
for real estate. There is
grassy pastured hills,
fair areas of *Artemisia*
californica, some invaded
by trees, and some good
patches of low open or closed
forest. Roads make much
of this quite accessible.

East of this, Mt. Diablo
is more rugged and rocky,
apparently has some
true chaparral, some
forest, and much rocky
steep grassland, as well
as some gentler grassy
slopes.

Valleys filled with fog.
See fog in morning, covered
by fog, a few spots open.

Foot hills of Sierras covered
by fog, up to the top of large
chaparral areas. From this
on is very largely a

mosaic of large areas of
open forest with a smaller
area of chaparral, the
boundaries of these of ten
not sharp, flat valley
bottoms cleared for some use

logged. Only well up in
the mountains are
areas of closed coniferous
forest, these varying
locally to open forest and
chaparral. Open slopes
with scattered trees
more and more common
upward. A little scattered
snow in the lower open
forest, more in the closed
forest, upper mosaic of
closed forest, open forest
and open slopes deeply
snow-covered. More
and more open snow
and rocky ridges and
slopes upward, till country
is essentially bare with
patches of open forest in
valleys. Much bare rock.
Snow not especially
heavy. Some high granite
horns and ridges with
almost none.

Eastern slopes have almost
no snow.

945
Around lake to north, some
forest north and a little
west of it, with considerable
snow. Otherwise, along
coast south and southeast
of lake very little snow, large
gentle slopes of sage-bush,

scattered junipers...
on sides of ravines
and canyons.

Then considerable areas
of rather dissected
slopes and low mountains
the upper parts of which
are covered by open coniferous
forest, a savanna, of low
trees, lower slopes ~~the~~ sage
bush, & some alluvial
fans covered by sage brush.

952

More hills with open forest
and savanna. Then what
seems to be desert with
only very sparse vegetation,
quite dissected, uncolored
not even the low mountains
showing any visible veg-
etation from this altitude.

953

Several dry lakes with
broad alluvial fans ending
down to them. On the fan
south of dry lake nearest
course what appears to be
old partially stabilized
sand dunes some pointing
northwestward. A highway
crosses this fan. These dunes
would be worth investigating
on the ground.


957

Another small dry lake ^{valley flat}
immediately to left of course,
with what appears to be clumps

of vegetation holding small
dunes or tumuli on fans
around it. Very rocky
hills or low mountains
east of this, with scattered
junipers.

1010

Then broad valley.

Large areas outcropping
from fan debris covered
by scattered whitish spots
that must be prospect holes.
Slightly hilly land,
then another enormous
valley with great fans,
an  shaped air field
but no town at all on this
side of course. Large strips
of transversally arranged
dunes. Very little vegetation
evident in all this country
except in another fan
sparsely sage-brush.

1012

Some mountains protruding
through alluvium.

Then bare low mountains
and alluvium filled
valleys, dissection not
very sharp. Rugged
high mountains far to
north.

1015

Wide valley some patches
of dunes.

1016

Low mountains with scattered
trees, much higher and wooded
to north.

Then another broad flat
and deep, straight valley
(or railroad) crossed the low
pass in the mts. and the
valley.

- 10:15 Then much bare
irregularly low mountains
and dissected country
with crevasses, several
filled valleys. What appears
to be a large flat immediately
along course, with a large
road running down to
a large dry lake somewhat
to north. South of it rather
mugged mountains with
open coniferous forest on slopes
a little snow. Then
much higher mountains
~~between~~ ~~Holmes~~ ~~the~~ ~~road~~
Mountains with some
woods to north, which
a line of low, along course
down for slopes slightly
spotted with gales and
prosper holes? or what
10:25 A wide valley with a stream
with water and some
small dams, rather extensive
area of marshes extending
far to north, running
upward
Rather low mountains
wooded to north, to east of

- 10:30 this valley, then a sandy
basin. Then a low
mountainous area
with scattered trees,
denser with a little
snow on higher north slope.
Another wide valley.
Then a near the Nevada-Utah
border. Isolated small
ranges in generally
alluvium-filled area,
some of these rather
high and well forested.
10:35 Little snow on north
high slopes. Crossed a
fairly high range with
another considerably
higher to north.
Ahead alternating
ranges and alluvium-
filled valleys with
dry lakes, for some
distance. Valleys bare,
scattered junipers on
dissection, mountains
sparsely to moderately
wooded. Very little snow.
10:40 A couple of small lakes
with water in valley
to north. Otherwise
alternating bare flats
and sparsely wooded
mountains.
10:45 Low higher peaks with pretty dense forest.
a little snow. The forest here

- everywhere. immediately
eastward some sandstone
is visible.
- 12.44 To north a large valley
along course and about
very narrow basins
country with patches of
good coniferous forest,
some snow some clouds
more so ahead. Deep
desert valley south,
a small flowering bush
and to north, a small town
or two, surrounded by
high mountains, some
very colorful, mostly
light and are dark mountains
west to north.
- 12.48 A small cloud.
- 12.49 Cultivated valley with a small
stream meandering through
but not wide.
- 12.51 The base of clouds and
open ground, some snow.
- 12.52 A small valley with
steep walls and
little dissected by flow
out to red ^{the first} rocks. No
vegetation.
- 12.53 A fastness, some snow
cloud, better, more snow. To the
away to north. A thick
red bed with yellow above
and below. Eastward

- very dissected land, pattern
complex but less spectacular.
Then some hills spectacular
erosion again. Vegetation
very sparse in rougher
spots some juniper or
sagebrush.
- 12.54 Wide bare desert plain.
Then clouds.
- 12.55 Same as similar plain,
no visible vegetation, ground
mostly reddish.
- 12.57 Crossed a large river with
a little water and
much dry bed. This conspicuously
white. Tributaries also
with white beds. Perhaps too?
Eastward this bare
plane rather irregular.
Then clouds.
- 12.58 Clouds thinned out.
Land is entirely under
cultivation except for
numerous dendritic gully
systems which are sparsely
densely wooded.
- 12.59 A few small woodlots.
- 12.60 A large city on a
southeastward running
meandering river.
No snow at all in this
whole hatched area.
- 12.61 Large meandering river
becoming almost parallel with
down then crossing it. Ten

149 Little snow on ravines. The
snow visible parts north.
150 Bullington. No entrance
in. covering no ground, but
not very fresh. Rather little
level in pulled land. Bullington
through. Not much wooded
and generally cultivated
falling forest along rivers
and streams.

151 covering more snow.
152 ground covered with snow
conspicuous falling forests
along rivers to north, flowing
eastward.

153 have very complicated meander
patterns in a wide frozen river,
crossing course toward S. S. E.

154 have gently no change topography
showing ancient dendritic
pulling. Even small streams
mostly slightly curved. Tightly
meandering.

155 Wide frozen river, running
generally southward. ~~drift~~
shifting of tributaries, showing
very gentle relief.
tributary systems dendritic.
Main streams wooded. Other
was ~~drift~~ ~~drift~~ ~~drift~~
land mostly treeless except
around farm houses.
Small raised stream
have been mostly channelized.

have very complicated
drift and patterns in
agricultural lands.

Bottom lands of larger
streams or rivers wooded.
Meandering conspicuous.
wood Mississippi R.

70- Very complicated system
of channels and islands.
Adam's north probably
one below course, also.

702 Series of parallel low ridges
appearing east from river.

704 What seems to be an old,
extremely flat bottomland
with bluffs. But with
no river course, running
southeast. May have
been an ancient lake bed
completely cultivated.

Very flat land east of it,
completely but rather
thinly snow covered.

192

193

Tomato Bake

Cook 4 ounces elbow macaroni in boiling salted water for about 10 minutes. Drain and rinse. Combine $\frac{1}{2}$ cup milk, $1\frac{1}{2}$ cups soft bread crumbs, $\frac{1}{2}$ teaspoon salt, 1 teaspoon Worcestershire sauce, 1 $\frac{1}{2}$ tablespoons prepared mustard and 1 cup cubed American cheese in a saucepan. Heat slowly until

ed and mixture is creamy. Fold in cooked macaroni and $1\frac{1}{2}$ cups cubed cooked ham. Pour $\frac{1}{2}$ of this mixture into a greased casserole. Next, arrange a layer of 4 fresh tomato halves over the macaroni. Add remaining macaroni mixture. Top with the other 4 tomato halves. Cover entire top with bread crumbs. Bake in a moderate oven (375 degrees F.) for 25 minutes. Makes 4 servings.

PAGE 39

ES DIE!*

U SPRAY

L-KILL

LLER

with
Isle Hobbyists

Hikers Discover Varied Plants

By HARRY A. WHITTEN

The Hawaiian forest is unusually rich in variety of plant life, not only of native plants but also in the large number of plants introduced here.

Those who took the Wai-anu hike last Sunday had opportunity to observe the variety.

There is a shrub in Wai-anu that is endemic to this region, that is, it was found nowhere else in the world when first identified by the botanist, Dr. Joseph Rock.

It is named *Solanum carterianum*, after Hawaii's second Governor, George R. Carter.

SHRUB SPREADS

In the years since it has been reported spreading to Waialeale and Waikane, the two valleys adjoining Wai-anu.

Also in Wai-anu is the white strawberry guava, seldom seen elsewhere, according to Thomas R. L. McGuire, veteran forester.

These are a few of the examples of plants to be found along one Oahu trail.

The Hawaiian Trail and Mountain Club has no hike this coming Sunday, as members are having their annual luau at their Waimanalo clubhouse.

R. J. Baker, kamaaina photographer and president of the club in years past, has returned from a trip to Europe that included 27 days in the Soviet Union, as well as shorter stays in Poland and Czechoslovakia, topped off by three weeks in Paris.

Mary Jane Bagley has also returned to Honolulu, after working in Washington, D.C.

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199

200



